102136

JPRS-UMA-85-018

6 March 1985

19981016 068

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

DTIC QUALITY INSPECTED 2

FBIS FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

2
106
A06

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

NOTICE

A new serial entitled WORLDWIDE REPORT: ARMS CONTROL will be published starting in March 1985.

The new report will contain Soviet, European, and other foreign media reportage and commentary on arms control issues, negotiations, agreements, and treaties. Much of the material will be reprinted from the regional FBIS DAILY REPORTS.

U.S. Government consumers may arrange to receive the new report through regular publications distribution channels or by contacting:

FBIS/Liaison and Requirements
P.O. Box 2604
Washington, D.C. 20013

Other consumers may order the report by contacting:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

JPRS-UMA-85-018

6 March 1985

USSR REPORT

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 12, December 1984

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

CONTENTS

YEFIMOV STRESSES MILITARY AVIATION PERSONNEL PROFESSIONALISM

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 1-3

[Article, by twice Hero of the Soviet Union and Honored Military Pilot USSR Mar Avn Aleksandr Nikolayevich Yefimov, first deputy commander in chief of the Air Forces: "Moral Fiber and Professionalism of the Combat Pilot"]

[Text] A new training year has begun in the Air Forces, just as in the other branches of the USSR Armed Forces. Considerable organizational work has been carried out in aviation units and subunits in preparation for it. Training curricula and schedules have been revised on the basis of the results achieved this past year, facilities have been refurbished, and unit and subunit personnel have adopted new, more ambitious pledges. As always, Communists march in the front ranks in the socialist competition under the slogan "Our Selfless Military Labor in Honor of the 40th Anniversary of the Great Victory and the 22nd CPSU Congress!" By their selfless labor they are inspiring others to achieve excellent results in combat and political training, in achieving consummate mastery of the equipment entrusted to them and its combat employment, and further to boost their ideological-theoretical level and psychological conditioning.

In just a few months our country and its armed defenders will be celebrating the glorious 40th anniversary of the victory by the Soviet people over the dark forces of German fascism -- the shock-troop vanguard of world imperialism and reaction. We achieved this victory at the cost of enormous sacrifices. The Soviet homeland lost more than 20 million of its sons and daughters in the Great Patriotic War. The fate not only of the world's first socialist state and progressive Communist ideology but also the fate of many European countries which were under the heel of fascist occupation forces was being determined in the savage battles on the Soviet-German front.

In this war our people defended their honor, freedom and independence, liberated from bondage many peoples of Europe, and today are successfully building a bright future. The successes of Soviet citizens and the toilers of the other countries of the socialist community in peaceful, constructive labor serve as a thorn in the side to these latter-day claimants to world domination. Under the NATO banner and led by the United States, aggressive imperialist circles dream of destroying the Soviet Union and the world

socialist system and of bringing the world's peace-loving peoples to their knees.

But the Joint Armed Forces of the Warsaw Pact member nations stand in the path of execution of these sinister schemes. Efforts by ultrareactionary circles in the United States and NATO strategies to tip the existing military-strategic balance, to achieve military superiority over the socialist nations and to dictate their own terms from a position of strength are doomed to failure. In a situation of confrontation between two different ideologies, the forces of peace and war, the forces of democracy and socialism on the one hand and the forces of reaction on the other, Soviet aviation personnel, solidly ranked behind the CPSU Central Committee, are keeping vigilant watch over the aggressive intrigues of militant imperialist circles, are working tirelessly to improve their military skills, and are standing vigilant guard over our country's airspace.

Characterizing the Soviet military pilot, it is correctly stated that he is a person who is totally dedicated to his socialist homeland, an ideologically conditioned, highly-educated specialist, capable of rapidly and thoroughly mastering a complex aircraft and its combat employment in all weather conditions. A pilot is concentrated will, firm character, boundless valor and courage, and the ability to make a bold decision and carry it out to completion.

During the years of difficult ordeals for our homeland and during days of peacetime training, Soviet aviation personnel have demonstrated by deed their faithfulness to the party and people, their dedication to Communist ideals, and their persistence in carrying out their assigned tasks. During the civil war years 235 Red military pilots were awarded the highest decoration at that time for their courage and heroism -- the Order of the Red Banner. The entire world is familiar with the names of the pilots of the Chelyuskin epic -- the first Heroes of the Soviet Union, the names of famed pilot-heroes V. Chkalov, M. Gromov, V. Kokkinaki, and many other pioneers in mastering new aircraft.

Mass heroism on the part of Soviet combat pilots was displayed during the Great Patriotic War. The vaunted fascist air aces felt the force of their blows, the unwavering firmness of their morale, their fearlessness and self-sacrifice. During the war years 2,420 Soviet aviators were awarded the title Hero of the Soviet Union, 65 were twice awarded this title, while A. Pokryshkin and I. Kozhedub were three-time recipients.

Soviet military pilot party member Yuriy Gagarin, the first man in space, brought permanent fame to our homeland during days of peacetime productive labor. The homeland honored with the title of Hero of the Soviet Union the selfless deeds of military pilot-internationalists V. Gaynutdinov, V. Shcherbakov, V. Pavlov, V. Kot, Ye. Zelnyakov, and other courageous aviators.

For indefatigable persons of inquiring, searching mind there is always a place for heroic deed. When the time comes, they perform such a deed. And whenever the question arises of what stands behind such a deed, the answer inevitably suggests itself: lofty Communist moral fiber and the highest level of professionalism. It is precisely these components which define the moral-

political content of the person of the combat pilot, his level of specialized military proficiency.

Moral fiber means a person's devotion to a specific system of ideas and its corresponding social, moral, and aesthetic ideal; it is a consistent faithfulness to them in theory and in practice.

Within the system of combat and political training, the forming of strong moral fiber and professional skill in Soviet aviators comprises a unified, integral process of training and indoctrination. During his time at school the pilot cadet, in addition to specialized training, acquires basic knowledge of the social sciences, studies guideline party documents, forms and shapes his Marxist-Leninist ideology. In the subsequent course of his military service, having become an officer, he deepens his knowledge and works independently on increasing his intellectual breadth, working persistently on studying the writings of the founders of Marxism-Leninism and the decisions of party congresses and CPSU Central Committee plenums, and taking part in Marxist-Leninist training seminars, where vital problems are discussed which pertain to this country's affairs, the domestic and foreign policy of our party and state, and the activities of one's outfit as a component part of the entire socialist society. Thus the officer, gradually increasing his knowledge of theory, gaining an understanding of the class sources of various ideological trends as well as the class essence of Communist Party policy, and constantly implementing party decisions, confirms and consolidates his own Marxist-Leninist ideology. "It is precisely this," notes CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, "which makes party members and toilers conscientious political warriors, capable of independently appraising social phenomena, seeing the link between current tasks and our ultimate goals, and conducting a well-reasoned debate with any ideological adversary."

However, if a person knows theory well, but this knowledge has not become conviction, or if a person has willingly adopted the rules for living existing in our society, the requirements and Communist slogans, but does not possess a deep understanding of their ideological content, his moral fiber is highly doubtful.

As we know, ideynost' [moral fiber, ideological content, moral principles] is manifested in all areas of life, in people's deeds and actions. If a pilot or commander is indifferent toward all new things appearing in practical combat training, fears responsibility for accomplishing difficult tasks, and shuts himself off within a narrow group of interests, regardless of whether they apply to daily living routine or technical matters, personal or group, if he holds himself aloof from vital problems or tends to go his own way while ignoring the collective, and makes every effort to justify this philistine ideology, while pretending devotion to moral principles, this constitutes ideological narrowness and total absence of principle. V. I. Lenin demanded that one combat all forms of its manifestation.

Communist moral fiber is inseparable from party-mindedness. It demands rigorous unity of a person's theoretical convictions and their practical implementation, a unity of word and deed. At this point a second component

enters the arena -- the combat pilot's professional skill. Characterizing the spiritual and material aspects of the military socialist organization, Vladimir Il'ich Lenin wrote: "The very finest army and persons who are the most dedicated to the cause of the revolution will be immediately annihilated by the adversary if they are armed, provisioned, and trained to an inadequate degree."

The party and Soviet people have placed first-class military hardware in our aviators' hands. Thorough, detailed training is necessary, however, in order successfully to operate a modern aircraft and effectively to utilize its systems and weapons. From the standpoint of our socialist ethics and morality, the combat pilot simply is not entitled to fly poorly. The modern fixed-wing or rotary-wing aircraft is the result of the labor of an enormous team of Soviet designers, engineers, and workers. It is readied for flight by dozens of specialists, and considerable funds are spent on support. It is for good reason that the aircraft is called a crew-served weapon, and the pilot culminates the trust and efforts of the team in carrying out a specific combat mission. A poorly trained pilot is a sitting duck for the adversary in a combat situation and a potential cause of an air mishap in peacetime. In any case he can cause society both moral injury and material detriment. And this means that the very idea for the sake of which he serves and works will be discredited. Thus it is essential to have a great deal of knowledge and ability, to become a genuine professional in the finest meaning of the word in order to fly well, fight the enemy well, and win.

"Hardware-aerodynamics-tactics" -- this substantial formula provides fundamental direction in the theoretical training of the combat pilot. Each component is a vitally important necessity. Any gap in knowledge of the equipment or the aircraft's aerodynamics can lead to a mishap-threatening situation, while errors of omission in tactical proficiency as well as predictable routine in the pilot's actions will result in defeat in combat.

In daily combat training in the classrooms and at the airfield, during training drills and flight operations, as well as during hours of independent training, the combat pilot amasses knowledge, hones his flying technique and combat employment in various conditions, and improves his professional skills. It is impossible, however, to achieve the heights of flying professionalism alone, separate from the rest of the team. In order to become a true professional, the pilot should constantly develop in himself a need for independent study, purposefulness in his work, and a profound conviction that his work is needed by the Soviet people.

Both the command authorities and the collective exert influence on the forming and shaping of flying professionalism. Flight personnel strive persistently toward the stated goal when there is a need to achieve it. Consequently, if an idea is interesting and significant for everybody, it becomes a common asset, and the achievements of the group, just as the success of each member, equally gladden all. In such a case growth of personal and group expertise is obvious.

Unquestionably any member of the collective can give birth to a fruitful idea. But it is primarily the commander and political worker who should support it,

arouse interest in it, and inspire people to pursue a good idea. The commander and political worker possess appropriate authority and responsibilities for this. But party and Komsomol activists, profoundly aware of the social significance of a new undertaking, should constantly encourage people's interest in a specified activity and support people's enthusiasm. Only then can one count on success.

For example, in the squadron under the command of Lt Col V. Vladarchuk all pilots are 1st class and expert at combat application. The subunit always successfully accomplishes flight-operations tasks pertaining to the combat improvement program, as well as missions assigned at exercises, and there is good reason for this. The squadron commander and his deputy for political affairs are well aware that if they rest on their laurels their subordinates may become indifferent and be guilty of errors of omission in their personal training, and this means potential air-mishap situations. Of course such a situation should not be permitted. And the squadron commander and subunit political worker, relying on support by the military community, maintain in the outfit an atmosphere of strong personal responsibility on the part of each pilot for thorough ground preparation for flight operations. The squadron commander, his deputy for political affairs and the party organization secretary work in unison in matters pertaining to organization of combat and political training, personnel daily life and routine.

In preparing for flight operations the pilots, under the supervision of the flight commanders, skillfully compute maneuvers and suggest their own variations and solutions. Complex elements are carefully calculated on a portable computer specially adapted for solving such problems.

The squadron has many of its own variations of engagement and conduct of battle in pairs, flights, and groups of various tactical designation, variations which have been practiced and mastered in the air. One must admit that success was not achieved immediately. But the setbacks did not discourage people but, on the contrary, impelled them to search for a solution. Sometimes it would be necessary to abandon certain conventional notions and acquire new skills.

For example, when flying through one of the calculated variations in executing a vertical maneuver with descent, flight leader M. Tukhbatullin failed to maintain timing and delayed initiation of the maneuver by 3 seconds. As a result the aircraft pair reached the attack position at an excessive distance. Naturally they were unable to engage the "adversary." In addition, the latter was given the opportunity to hit the main group of fighters.

It was ascertained at the sortie debriefing that according to the conditions of the mission losses could have been greater. The reason was also determined. It turned out that the leader, spotting the "aggressor," failed to heed the computations, since with visual contact with the target it was premature to initiate maneuver. The resulting delay by just a few seconds caused failure in flying the new tactical device. The pilots saw with their own eyes what unity of theory and practice means.

The squadron commander's practical suggestions were given support by Lt Col V. Chuyev, until recently the commanding officer of this unit. Being himself an inquisitive, searching individual, the regimental commander did not restrict the initiative of the squadron commander but gave him support and assistance, and himself frequently flew as a member of various groups. All this unquestionably had a positive effect on growth in the pilots' combat skill, helped maintain their continuous interest in their own professional improvement, and helped boost the subunit's combat readiness. As a result, for several years the squadron has borne the title of excellent and has been a solid leader in socialist competition.

At the same time experience indicates that if a commanding officer is not himself interested in a new undertaking, one can state with complete assurance that he will be unable to evaluate the innovative enthusiasm of his men, their zeal, and consequently will be unable to support a valuable idea. As a result a good idea, a spark of innovation may die out without bursting into flame. In such a case thinking, seeking individuals, if they do not become closed up within themselves, as a rule try to be reassigned. Of course one also encounters those who try to humor their superior and pretend that he is doing everything right. The results of this are most clearly evident at performance evaluations. Usually there is not a high degree of professionalism in such a subunit, and of course it cannot be adequately combat-ready.

An important directional thrust in forming flying proffesionalism and strong moral fiber is dissemination and publicity of the fine fighting traditions of the Air Forces. The history of Soviet aviation contains thousands of examples of heroic exploits and selfless deeds. They have been performed by persons who have selfless love for their homeland, who are ideologically firm and well trained professionally. The social significance of courageous actions is well known. Subsequent generations of aviators learn from such examples and emulate them. They demonstrate once more that any heroic act is a logical result of daily indoctrination, of ideological and professional improvement of the individual. Raised in a spirit of filial love for their homeland and totally dedicated to the cause of the party and people, combat pilots carry out their duties conscientiously and are deeply convinced that this is an important job for the benefit of the socialist homeland.

Head-on attacks by Soviet fighters were a common occurrence in the last war. Our combat pilots maintained heading in conditions of the greatest danger. It required a great deal of self-control, composure, and skill to wait for the adversary to lose his nerve and break off, and to put a lethally accurate burst into him within a fraction of a second! And what about penetrating through heavy antiaircraft fire to a ground target, when the probability of being shot down was extremely high? Whatever might be thrown at them, our pilots would not turn from their course and would put accurate fire into the enemy. This is an embodiment of a strong fusion of a high degree of moral fiber and professionalism, which helped Soviet fighting men gain brilliant victories over the hated foe.

Fighting traditions grow stronger and continue to evolve from one generation to the next, constituting that inexhaustible wellspring from which Soviet

aviators have always obtained inspiring examples of selfless, faithful service to the party and people, execution of one's patriotic and internationalist duty, and a high degree of political consciousness and professional skill.

Our fine traditions and broad spectrum of aviation professions need continuous and purposeful publicity. This is particularly essential for young people, who are faced with selection of a future career. And at this point I should like to touch upon another important question. Every aviator, regardless of his specialization, like it or not is a publicizer of aviation. In conversations and discussions, especially with civilians, when aviation comes up, military men with the blue shoulder boards relate incidents from their practical flying experience, telling about the courage and heroism of members of aircrews and ground personnel. It is a good thing when such a narrator knows flying inside out, as they say. But what if he does not? Fantasy, falsification, and sometimes even unprincipled bragging about made-up acts of heroism are inevitable. It has been noted that young people, who have not experienced the genuine school of life and career, are most frequently guilty of this. These generally decent individuals, attempting to embellish and complicate the situation around an incident about which they have learned through hearsay, unfortunately fail to realize that they are doing flying a disservice. Inspiring fear in their audience, they push them away from the fine, courageous, and noble profession that flying has always been.

But that is only one aspect of the matter. It is worse when an experienced officer and aviator, who has gained a fairly good mastery of the specialized aviation terminology, in attempting to display his brilliant knowledge to his audience interprets a given fact unobjectively, from his own point of view. As a rule the audience listens closely to and believes such a speaker, and as a result people gain an erroneous idea about things.

This particularly applies to materials appearing in the print media and literature about aviation. For example, in attempting to reveal his hero's personality and character and the specifics of his job, an author who has little acquaintance with flying describes as a rule its external, most attention-getting features, while when attempting to describe an aviator's internal state and present motivation for his actions he frequently ascribes qualities to him which are sometimes uncharacteristic of the flying profession. For example, most frequently some unusual incident is taken to show courage, independence, boldness in decision-making, and quickness of response. It is certainly true that an emergency situation most vividly brings out a person's strong psychological and special qualities, but aviation and flying do not consist exclusively of such incidents. On the contrary, one of the most important and noble tasks of each and every aviator is to ensure that there occur no emergency situations or accidents due to ignorance, lack of discipline, or lack of training. The main import of flight safety consists precisely in this. And the road to this lies through the highest degree of professionalism. In other words, every person working in aviation, regardless of whether he is aircrew or ground personnel, should know his area of specialization thoroughly, carry out his assigned duties with precision, and be profoundly aware of the degree of responsibility for the results of his labor. Moral fiber and civic courage also consist in this.

Aviation and the flying profession merits being discussed in a straightforward manner, openly, relying only on facts and with no embellishment. Man's work separated from the ground is in and of itself romantic and characterized by features lacking in other professions. It is not without reason that persons who are strong in spirit, who are conditioned both politically and morally, who are true patriots and courageous fighters for communism serve in aviation.

Air Forces personnel will be accomplishing large and difficult tasks in the new training year. Preparations for the 27th Communist Party Congress and for celebrating the 40th anniversary of the Great Victory, as well as completion of the 11th Five-Year Plan demand a full effort. Soviet aviation personnel are filled with resolve to accomplish all assigned missions with honor and to achieve targeted levels of performance in combat readiness.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

NIGHT LANDING ONTO AN UNLIGHTED RUNWAY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) p 4

[Article, published under the heading "For a High Degree of Combat Readiness," by Military Pilot 1st Class Capt V. Kalyakin: "Onto an Unlit Runway"]

[Text] ...It was the middle of the night. Darkness completely concealed the partisan forest airstrip. The silence was disturbed from time to time only by the cry of a night bird, the rustling of foliage, and muffled conversation. Suddenly an indistinct rumbling sound was heard in the distance. It steadily increased in volume and soon swelled into the mighty roar of aircraft engines.

Signal fires simultaneously burst into flame on the ground. The aircraft, circling the glade once, commenced its landing approach. Its landing lights, flitting along the treetops, grasped the tiny landing strip out of the darkness, and soon the aircraft softly touched down....

During the years of the Great Patriotic War partisans were accustomed to such a scene. This was how the people's avengers received weapons, ammunition, and medical supplies from the Soviet-held heartland and evacuated sick and wounded comrades.

For us aviation personnel of the 1980's, the combat experience of the war pilots is a priceless asset. It convincingly demonstrates that every pilot, and particularly command personnel, should be prepared to operate in the most difficult conditions: to fly into fields of limited size, to land at high-mountain airfields on the approaches to which there are natural obstacles, and to land under adverse weather conditions and at night onto an unlit runway.

Of course aircraft, under the influence of advances in science and technology, have changed considerably since those far-off war years. The navigation systems of today's aircraft make it possible to navigate en route with a high degree of accuracy and to shoot a landing approach in all weather, day and night. The final phase of approach and landing, however, continues to be possible only with the runway visible. And naturally the greater the pilot's experience, proficiency and moral-psychological conditioning, the more calmly and confidently he performs his job in a difficult situation, for when flying at night, especially in combat conditions, the need to put one's aircraft down

onto an unlighted runway with one's landing lights alone may arise at any moment. The pilot experiences the greatest difficulty in executing such a landing at the moment of height determination for commencing the roundout. Other difficulties are also encountered.

Our subunit's young pilots had to put in a good deal of work to master this type of landing. Work in the air was preceded by intensive, purposeful preparation on the ground, in the course of which we thoroughly studied the specialized literature, recommendations by the unit methods council, and the experience of our senior comrades. We devoted considerable attention to analysis of mistakes made by pilots during previous flight operations. Sometimes, for example, pilots would abort and go around because their landing lights were incorrectly adjusted. For this reason aviation engineer service maintenance personnel tested and adjusted the landing lights on all aircraft prior to night landing practice.

During this period exchange of experience and know-how with pilots who had already mastered the technique of landing on an unlighted runway was organized at the initiative of the subunit party buro. Officers N. Savchenko and S. Filin discussed flying technique and attention distribution on the approach and landing. A very important detail was ascertained at this point. It turns out that as a rule pilots make one and the same mistake upon approaching an unlighted runway with their landing lights: they begin and end the roundout high. Not seeing the ground, they commence pulling back on the controls too soon, as a result of which the aircraft crosses the runway threshold rather high, and they touch down too far down the runway. I also made this error. I shall describe it in more detail.

...After reporting to the tower, I commenced my landing approach descent. After determining that the aircraft's descent path was taking it right to the threshold lights, I checked my airspeed and at the prescribed altitude hit the landing lights. There immediately appeared ahead of the aircraft an unaccustomed screen of illumination which obscured all the runway lights. It was a strange sensation, I must admit. It cut me off from the outside world, as it were. In addition it drew my gaze, distracting attention from the business of flying.

The runway lights were getting closer. I had the impression that the aircraft was very close to the ground. But where was the ground? My hand wanted to pull back on the controls. I forced myself not to. At last! I began to make out individual details in the scattered beam cast by my landing lights. I focused my entire attention on determining the height at which to commence roundout: the main thing was to avoid flaring too high. The ground was coming up on me. I began smoothly pulling back on the controls.

"Too soon!" I heard the instructor's calm voice in my headphones.

Only then did I notice that I had in fact flared a bit high. The runway threshold lights flashed past under my wings, and I could make out the gray concrete runway surface. I stopped pulling back on the control stick and held it in position from the moment the instructor's warning came over the headset. The aircraft again began to settle toward the runway surface. I could now see

the runway more clearly. Nevertheless it was difficult to determine the aircraft's position in relation to the runway due to the unaccustomed illumination.

The ground was quite close now. I smoothly eased back the throttle.

"Stick back!" the instructor's command forced me to pull more vigorously on the controls.

The aircraft touched down, taking me somewhat by surprise. As a result the landing was rougher than usual.

My second landing was better, and I soon fully mastered this rather complex procedure. The other pilots of our squadron also began doing a better and more confident job of landing at night onto an unlighted runway with landing lights.

Considerable time has passed since then. Other pilots have been duty-assigned to the subunit. This problem is not yet being resolved, however, although in my opinion it continues to be essential to devote the closest attention to this complex phase of flight training, for landing at night on an unlighted runway is no simple matter, but requires considerable skill and constant practice.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

VERY LOW-LEVEL GROUND-ATTACK MISSION CONFIGURATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) p 5

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Military Pilot-Expert Marksman Lt Col G. Klenin: "From Extremely Low Level"]

[Text] Low, gray clouds drifted overhead, and a cold, fine, misty rain was falling. Flying is rather difficult in such weather. But the weather was also making things difficult for the "aggressor" air defense personnel: just try to distinguish target from precip returns on the radar screen.

But of course one could not count on the fact that the "aggressor" would scarcely expect an air attack due to the bad weather. The powerful, well-organized air defense system could not be penetrated if special measures were not taken. Squadron commander Lt Col Ye. Kudinov was thinking precisely about this as he planned and scheduled his aircrew's sorties. The aircrews had to neutralize the "aggressor's" air defense in the breakthrough sector at the designated time and hit the target airfield.

Having thoroughly studied the situation on his map, the squadron commander reconstructed it on the board and marked the en-route flight path of the forthcoming mission. It closely approached a tract of forest.

"The 'aggressor' has very probably deployed air defense weapons here," the squadron commander opined. "His reasoning is simple. Our aircraft will be forced to fly at greater height above the forest and will be visible to the radars. And this is precisely what he needs. Does anyone have any other ideas?"

"In my opinion the target should be attacked from low level and coming from another direction," suggested Maj A. Kolodyazhnyy.

"I agree. And we should attack without a pause and at high speed," the squadron commander added. "There will be little time to find the target. Therefore everybody should prepare thoroughly for this mission."

Following the briefing session, the pilots refined their calculations and added supplementary reference points to their maps. The command post gave the command to take off. The combat aircraft took off into the overcast one after the other. Reassembling on top, the force proceeded to head toward the "aggressor" airfield.

The mission proceeded with restricted radio communications. Soon the aircraft were approaching the hostile radar coverage zone.

At the agreed-upon signal by the leader, the wingmen dove for the deck. Proceeding at high speed, the group entered the air defense radar coverage zone.

Hugging the ground to reduce as much as possible the detection and SAM engagement range, utilizing special equipment which provides extended-flight nap-of-the-earth capability in combination with visual position determination, the group proceeded toward the target. In order to deceive the radar operators regarding intentions, force deployment and nature of the mission, pilots A. Kolodyazhnyy and Yu. Rekhov, who were leading the group, switched on ECM jammers to make things harder on the "enemy."

Flying past the airfield on the northeast, opposite the forest, the group turned into the target. The "aggressor" detected the aircraft too close for the airfield air defense weapons to swing into action. The pilots proceeded to open fire with all their weapons. Each aircrew went after a target which had been computed in advance. No "hostile" aircraft made it into the air. Officers Kolodyazhnyy and Rekhov scored accurate hits on the "enemy" missile and radar mock-ups. Mission accomplished.

Lt Col Ye. Kudinov's men achieved excellent results at that tactical air exercise, and this was no accident. The airstrike had been preceded by painstaking work on the ground: detailed study of maps, terrain relief and aerial photographs, and precise calculation of routes, time to reference check points, and maneuvers to penetrate "enemy" air defense. In addition, each crew precisely calculated speed, time and course corrections for coming over the target. This enabled the combat pilots to proceed boldly, resolutely, and hit the target with certitude. And this is the most important thing, for it is not enough to reach the target with precision -- the pilot's principal mission is to destroy it.

In analyzing the performance of Lt Col Ye. Kudinov's men, I should like to draw attention to the fact that in preparing for the mission the squadron commander assigned each pilot his own area and specific target to hit. This is quite correct from the standpoint of combat efficiency. Unfortunately not all commanders do likewise. It sometimes happens that several aircraft attack one and the same target, while other, no less important targets fail to receive hits, and in addition safety procedures are not observed. Unquestionably there is little benefit from such an attack. In an actual combat situation a commander's tactical unpreparedness will inevitably lead to unwarranted losses. This is also indicated by the experience of the war.

Also of considerable significance in the successful performance by the pilots of Lieutenant Colonel Kudinov's squadron was the fact that after completing the strike the aircraft departed from the target at low level. This made it difficult for surviving air defense weapons to offer effective opposition. We must emphasize that in this squadron serious attention is focused on low-level attacks on ground targets, since this configuration has considerable advantages. Aircrews must be well drilled, however, in order successfully to employ this technique.

I believe that one of the important shortcomings affecting preparation of flight personnel for actual combat is the fact that they work for the most part on permanent ranges where the target layout remains unchanged for long periods of time. Monotonous, unvarying placement of targets and good target visibility enable the pilots to fly target runs with their eyes closed, so to speak. Naturally there can be no initiative displayed in such a situation. Unimaginative routine is inevitable. Of course it costs a good deal to build a mobile range target environment. It would also mean an increased amount of work for range personnel. Nevertheless it seems to me that the result is worth the effort. Expenditures will be repaid a hundredfold by an increased level of flight personnel combat readiness. In my opinion efficiency innovators can make a large contribution to this effort.

As was demonstrated by the tactical air exercise in which Lt Col Ye. Kudinov's squadron took part, precise group flying coordination and skillful maneuvering in adverse weather conditions are of great importance for successfully accomplishing a mock combat mission. Any lack of coordination of actions enables the "enemy" easily to detect the attacking aircraft and gives away the attacking force's tactics. This nullifies the effectiveness of an attack.

Low-level flight ensures reaching the target undetected, but at the same time it makes the job harder for the tactical control officer, from whom one cannot expect help. In addition, group flying and maneuvering at low altitudes demand of each pilot a heightened sense of his position in the formation. Therefore mutual understanding and coordinated teamwork between aircrews assume particular importance. Of course it is not easy to achieve this. An improved method of group-flying training as pairs and flights is needed. Experience indicates that ground preparation is the principal form of training and preparation for such flying. On the ground one can thoroughly think through one's actions and coordinate them with the actions of the other pilots flying in the formation.

Low-level and very low-level attack is highly complex and hazardous. As practical experience shows, however, this mode continues to be the most effective in a situation with heavy "enemy" air defense activity. Employment of this mode of attack, taking into account design weaknesses and objectively existing deficiencies of air defense assets, makes it possible to achieve the greatest element of surprise and effective accomplishment of the mock combat mission.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.
3024
CSO: 9144/194

DISCIPLINE IN POLITICAL INDOCTRINATION URGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 6-8

[Article, published under the heading "Implementing the Decisions of the 26th CPSU Congress," by Maj Gen Avn A. Zhabin, military council member and air forces political department chief, Baltic Military District: "Discipline at the Forefront"]

[Text] Military discipline is an essential condition for increasing and a most important component of combat readiness of aviation units and subunits. In present-day conditions, when the international situation has become considerably more complex due to the intensified aggressiveness of imperialism, greater demands are being imposed on matters pertaining to further strengthening of organization and discipline. They were defined by the 26th CPSU Congress, further developed in the decisions of subsequent Central Committee plenums, and formulated in the well-known CPSU Central Committee decrees entitled "On Measures to Improve Party-Political Work in the Soviet Army and Navy," "On Further Improvement of Ideological and Political Indoctrination Work," "On Improving Efforts to Protect Rule of Law and Strengthen the Campaign Against Law Violations," as well as in the decree of the CPSU Central Committee, USSR Council of Ministers, and All-Union Central Trade Union Council entitled "On Further Strengthening Labor Discipline and Reducing Labor Turnover in the Nation's Economy."

Serious attention was focused on the growing role of military discipline in the age of nuclear missile weapons as well as the dynamic nature and complexity of military operations at the Sixth Armed Forces Conference of Primary Party Organization Secretaries. Presenting a report at this conference, USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, stressed that military discipline is primarily a political and moral/ethical category; the ideological conviction of military personnel and the spiritual maturity of the collective comprise its foundation.

Proceeding from this, the political department of the air forces of the Red-Banner Baltic Military District is focusing the main efforts of party organizations on improving ideological-political and military indoctrination of aviation personnel and on forming in them a heightened feeling of

responsibility for execution of military duty. Political agencies and party organizations, carrying out the task of strengthening discipline and organization, are seeking to ensure personal exemplariness by party members in performance of military and party duty as well as unswerving observance of Soviet laws and military regulations. The party committees and party buros of the vanguard units and subunits to which CPSU members officers Ye. Revko, V. Kozlan and N. Malakhov are assigned are constructing indoctrination work with personnel, and particularly with the indoctrinators proper, proceeding from the position that a party member should not only himself be a model of conduct on and off the job but should also aggressively combat any and all manifestations of slackness, mere going through the motions, and complacency. Firmness and an aggressive experiential posture on the part of the party member are considered here to be an effective instrument in the campaign to strengthen discipline and its moral/ethical underpinnings.

Take, for example, the guards aviation regiment in which Gds Lt Col Ye. Revko serves as party committee secretary. The men of this outfit were among the first in the district's air forces to swing support behind this training year's socialist competition initiators. I shall note that an aggressive experiential posture and a conscientious attitude toward carrying out one's military, party, and Komsomol duty characterize the majority of pilots, engineers, and technicians. Military discipline is also high in this outfit. Purposeful ideological indoctrination work, exemplary observance of regulations in the subunits, and rigorous daily demandingness on themselves and their subordinates by commanders at all echelons have become the most effective means of strengthening it.

Indoctrination of aviation personnel in a spirit of conscious discipline is organized in a differentiated manner and encompasses all personnel. Particular importance is attached to prevention of disciplinary infractions, which requires stepping up work with individuals who commit various infractions. The commanding officer, political worker, and party committee secretary usually call them in for a talk. Leader-Communists and party organizations keep a continuous eye on those who are inclined toward breaches of discipline. Activists work with them, and their fellow soldiers level criticism at them.

The party committee regularly analyzes the state of military discipline and internal order in the subunits. The members of the party committee give effective assistance to the party organizations of the squadrons and technical maintenance units in creating within the collectives an atmosphere of strong mutual demandingness, which eliminates instances of a remiss attitude toward one's job and instills in party members a feeling of responsibility for carrying out their military duty. Unfailing party integrity, daily indoctrination work with individuals, as well as attention and sensitivity toward others also help keep them from rash actions.

Effective party-political work, a firm course of policy aimed at increasing discipline and organization, improving the quality and effectiveness of training, and a campaign to achieve unconditional accomplishment of tough socialist pledges produce substantial results: the aviation personnel-guardsmen are successfully accomplishing their assigned tasks.

As we know, the words "poryadok" [order] and "poryadochnost'" [decency] have the same root. In the practical world as well it is difficult and sometimes impossible to separate the concepts of "discipline" and "morality/ethics." They are manifested in every undertaking, in every deed. Today such criteria as one's ethical reliability, professional pride, and officer's honor exert direct influence on the effectiveness, discipline, and quality of flying labor, indoctrination and training of personnel. Adequate attention is not always devoted, however, to these important issues.

Lt Tech Serv S. Kovalenko, upon graduating from service school, was assigned to the unit in which Major Gonozov serves as political worker. Kovalenko was assigned to an aircraft technician slot. Within a few months this officer lost interest in his job, responded incorrectly to rebukes by his superior, ignored advice from his comrades, and began drinking heavily. His lack of discipline and irresponbility almost caused an air mishap: following flight operations this technician failed to top off his aircraft's tanks, and on the following day he failed to show up for flight operations.

Of course this incident was not ignored. Kovalenko was disciplined. The question of strengthening military discipline was discussed at the next party meeting of the subunit.

The guilty party has been punished, and proper conclusions have been drawn. That would seem to be the extent of what should be done, but it is not. The moral aspect of the affair has not been addressed, as it were, for this young officer grew and was indoctrinated in a collective. His superiors and fellow servicemen were in daily contact with them and saw how day by day he was losing interest in his chosen career specialization area, how his sense of duty and honor were becoming deadened, and how bad tendencies were gaining the upper hand. And yet the others in the collective failed to sound the alarm. We already know to what Kovalenko's moral decline led. The subunit command authorities and party organization, however, saw in this only a deviation in law from the requirements of governing documents. For this reason a proper appraisal of the facts did not ensue, and for this reason decisions were of a predictable routine and the forms and methods of indoctrination work were meager.

Or take the following fact. Instances of breaches of discipline became more frequent in one of the military collectives. It would seem that the commanding officer, political worker, and party activists should have immediately taken effective measures. But instead of party firmness and strict demandingness, we see a different picture: deficiencies and errors in work performance are concealed by all possible means.

We analyzed in detail the work performance of command personnel and political agency chiefs aimed at strengthening military discipline and its moral/ethical principles. We pointed to shortcomings and gave practical assistance to lagging units and subunits. Meetings of the military council were also devoted to this matter, with a broad spectrum of command personnel and political workers asked to be present, plus work conferences and conferences of party and Komsomol activists. Frank criticism was leveled at the erroneous

position taken by some party members, who fail to analyze the reasons behind deficiencies and seek to reassure themselves and their superiors, and sometimes their collective as well with the illusion that everything is going well, and they attempt to gloss over rough edges. It was necessary to give some individuals a serious reminder of their professional and party responsibility for the state of affairs in the collectives entrusted to them.

At the same time support was given to those commanders and political workers who firmly observe the party policy line in this matter, formulated by CPSU Central Committee General Secretary Comrade K. U. Chernenko in his speech at a preelection meeting of constituents of Moscow's Kuybyshevskiy Electoral District in connection with elections to the USSR Supreme Soviet Council of the Union: "The strength of the leader lies in his ability to merge and coalesce the authority of office and personal authority." These comrades take a firm position and work resolutely to correct deficiencies in political indoctrination work with their men.

Worthy of maximum dissemination, for example, is the work experience of officer A. Kornev, a person with initiative, who looks to the future and has the ability to complete a job once begun. This leader-Communist organizes work in his collective so that it is smooth and well-coordinated, without empty show or ballyhoo, creating an atmosphere of trust, innovative search, and at the same time strict demandingness. Officer A. Kornev, his assistants and party activists do not wait for one of the aviation personnel to commit a breach of discipline or a violation of the requirements of guideline documents. Constant intercommunication with others, an individual approach in indoctrination work, and reliance on Communists and Komsomol members enable them to have better knowledge of the men's moods, attitudes and needs, to support a valuable initiative in a prompt and timely manner, to give help to those who need it, and to avert potential offenses. And we have a great many such commanders.

The majority of party organizations are constantly concerned with the development of leader-Communists, support their authority, strengthen one-man command, and seek to ensure that the standards of Soviet life and orders have the force of law, which must be obeyed by everybody without exception, absolutely and unquestioningly. An environment of lack of demandingness has not yet been eliminated everywhere, however. And it is precisely here that one observes incidents where certain leaders permit themselves to display rudeness, arrogance, and abuse their position.

The party teaches that consolidation of the leader's moral authority is inconceivable without a resolute struggle against those in whom, to use V. I. Lenin's expression, "convictions lie no deeper than on the end of their tongue." One should not consider here references to past services. Communists have an unwritten rule: if you have done well 100 times, that is too few, but if you have done poorly once, that is too many. Practical experience shows that the fighting spirit of the party organization and the entire military collective increases precisely in the effort to consolidate a businesslike attitude.

The attention of commanders, political workers, and party organizations of the district's air forces is also focused on such an important item as developing in officers -- aviation engineer service specialists and specialists of other services -- the skills and habits of leader-indoctrinators. We take the following position: all commanders, political workers, and party activists should demand of leader-Communists of the aviation engineer service and other technical support services that they conduct ideological indoctrination work with subordinates and take active part in party committee and party buro activities, for as it sometimes happens, instead of teaching a person to perform this job and constantly monitoring its progress and giving him timely assistance, they simply ignore the matter -- feeling that the main thing is that they have carried out their own job duties. And they give no thought to the potential consequences of this. This is precisely what happened with Lt Col V. Nikitin. This officer failed to do indoctrination work with his men and was reluctant about carrying out party assignments. And for some reason the command authorities and party committee accepted the situation. As a result some aviation engineer service specialists began regularly committing breaches of military and technical discipline. It took vigorous intervention by the political agency to put things back in proper order.

Aviation engineer service specialists and specialists from the other services are presently being extensively drawn into the indoctrination process in the units at the political department's recommendation. They are now being held more strictly accountable for the conduct of the junior aviation specialists under them. At the present time the overwhelming majority of them have party and Komsomol assignments, their reports are now being presented more frequently at party and Komsomol committee and buro sessions, at party meetings, and they are being assigned independent preparation of measures on a squadron and regimental scale. At the initiative of the party buro of which Lt Col G. Kovalenko is a member, for example, in the course of a tactical air exercise a brief technical exercise was held on the topic "For Excellent Flight Operations Support Discipline," at which the performance of technician personnel was subjected to skilled and demanding analysis, and measures to improve the quality of flight operations support and achieve effective conduct of the tactical air exercise were drafted and proposed as needed, utilizing the materials of the performance monitoring team for training engineer and technician personnel.

During these intensive days of combat training party members are mobilizing personnel to achieve new successes in military labor, to bolster word with concrete deed. The question of the role of commanders, political agencies, party committees and buros in improving the quality of monitoring and verifying execution occupies our attention focus, and for good reason. Practical experience indicates that adopted decisions and plans become an effective instrument for improving work only when they are backed up by practical organization of things and effective monitoring and verification.

We view strengthening of monitoring and verification as a most important component part of improving work style, a tested and proven means of strengthening party, military and labor discipline, of developing initiative and increasing people's personal responsibility for carrying out their assigned tasks. There was a serious discussion on the effectiveness of this

approach at a meeting of district aviation party activists. Purposeful criticism was leveled at those leader-Communists who had excessive faith in the magic power of their own decisions and orders, who had chosen a bureaucratic-motions style of leadership, who had not been conducting substantive indoctrination work with subordinates, and who had not been holding subordinates strictly to account for carrying out their assignments.

For example, in the outfit in which Sr Lt V. Bermichev serves as party buro secretary, judging by the documents everything is fine: after a decision is made or an order is issued, measures are specified for improving things, and detailed plans are drawn up. In actual fact, however, repetitive resolutions would be adopted on one and the same item, from which it followed that things were not moving, in spite of wordy and in general correct decisions. More experienced comrades worked with the young secretary, helping him, to use Lenin's words, "shift the center of gravity from writing decrees and orders... to selecting people and verifying execution."

A great deal has been done to achieve an all-out improvement in the quality and effectiveness of all indoctrination work to strengthen discipline and its moral/ethical foundation. But we are well aware that life is moving forward and is constantly placing new, increasingly tougher demands on training and indoctrination of personnel. The district air forces political department focuses commanders, political workers, and party organizations on improving their work in light of the demands of major party documents, and instructions by CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet. A responsible attitude toward things, initiative, and unswerving implementation of adopted decisions ensure success both in organization of the training and indoctrination process and in strengthening personnel discipline -- the foundation of continuous combat readiness of units and subunits.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

UNIT PARTY COMMITTEE SECRETARY PROFILED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 8-9

[Article, published under the heading "From Party-Political Work Experience," by Lt Col V. Makarenko: "Being Needed by People"]

> [Text] Not long ago I visited a unit in which Lt Col V. Bodnaruk serves. This was not the first time we had met. I had previously met Vladimir Mikhaylovich, when he was a party committee secretary. At the time I had learned many useful and interesting things about the work of the unit party organization and its secretary. Now Lieutenant Colonel Bodnaruk had been appointed to a higher position, and he had been replaced by a worthy successor. But I would like to talk about Vladimir Mikhaylovich's work experience as a party committee secretary. It is precisely in this position that he displayed the finest qualities of a party organization leader, leader-officer, and indoctrinator.

A heavy, gusting wind was blowing. The recently-planted cypresses along both sides of the asphalt path were bending groundward under the force of the wind. "They are still a bit weak," Lt Col V. Bodnaruk said to himself. "Will they make it?"

Lt Col I. Golovach walked past. He did not, as they say, give Vladimir Mikhaylovich a kilometer-wide berth. He simply looked right through him....

What should he do? Ignore this comrade's tactlessness and not attach importance to it? Lieutenant Colonel Bodnaruk was the party committee secretary, while Lieutenant Colonel Golovach was the regimental chief of staff. Both were engaged in a single, common cause, and for that reason there should be complete clarity in their relationship.

"Ivan Terent'yevich," Bodnaruk hailed him. "What's the problem? Are you on the outs with me?"

"Whatever for?" Golovach gave a surprised look and, shifting his gaze away, added: "I simply didn't notice you."

"Your feelings are hurt."

...There had been a difference of opinion between them at a party committee meeting, at which preliminary socialist competition results had been discussed. A debate had developed over who should be in second place. The subunits commanded by officers I. Ionov and V. Bulayenko were both claiming second. Bodnaruk maintained that Ionov's subunit deserved second, while Golovach favored Bulayenko. The members of the party committee supported the secretary's view. The decision was substantiated by the fact that every month this subunit produced stable results in combat training, and the subunit's Communists and Komsomol activists were skillfully guiding the efforts of the competing personnel toward accomplishing the main tasks.

A different situation prevailed in officer V. Bulayenko's subunit. In the month for which the competition winner was to be determined the men had done a good job. They had performed all target assignments with high marks, and there had been no breaches of military discipline. But deficiencies had been noted at an earlier date. Periods of vigorous activity had alternated with lulls. This was the reason why the leader-Communists and party committee members had temporarily declined to award the subunit second place in the socialist competition.

Lieutenant Colonel Golovach, a conscientious and knowledgeable individual who loved his job, cared a great deal for each and every collective. He very much wanted to encourage the men of officer Bulayenko's subunit. But the majority of members of the party committee did not agree with him. Ivan Terent'yevich also felt that an important role in determination of this matter was played by the authority of the party committee secretary. And now it was apparent that he felt offended. "That's all right. Time will tell," decided Bodnaruk.

...The unit commanding officer walked into the party committee. "Vladimir Mikhaylovich, I need your help. The men of two subunits are working under identical conditions, but producing different results. I shall have a talk with the officers, and I would like you to analyze the work performance of the party organizations."

Lieutenant Colonel Bodnaruk and the members of the party committee worked for several days in the vanguard and lagging subunits. The on-the-spot investigation indicated that in the leading subunit training activities are conducted on a high methodological level, the daily routine is precisely carried out, and work with individuals is well organized. The party organization here is also on top of things. It actively assists the commander in disseminating the experience and know-how of the best specialists, and it seeks to achieve exemplary training performance from party members.

In the neighboring subunit, however, indoctrination work among aviation personnel was being done rather poorly, and excessively close supervision had taken hold. Party members had also adopted a passive attitude. In short, there was plenty of food for thought.

The commander and party activists helped correct many deficiencies on the spot. They offered useful advice and recommendations. Nevertheless it was decided to discuss at a party committee meeting the matter of the party organization's work performance. This was due to the fact that there were similar flaws in certain other subunits. The decision was also made to present at each party committee meeting a briefing report by one or two party members on their performance of job-related duties and party assignments.

"With whom shall we begin?"

"I shall present the first report on practical work and ideological-theoretical growth," suggested Vladimir Mikhaylovich.

And now the party committee members and comrades were seated shoulder to shoulder. They listened attentively to their secretary. Bodnaruk spoke softly and unhurriedly. He stated what works of Lenin he had studied, how he was implementing the decisions of the 26th CPSU Congress and the recommendations of the Sixth Armed Forces Conference of Primary Party Organization Secretaries, and he reported on execution of instructions to party members. He also shared his experience in improving his technical knowledge. He recalled an incident from his practical experience.

...Patrons once came to visit the communications people. Deputy commander and party committee member officer M. Demeshchik showed them the training equipment. He gave a working demonstration of the units and stages. He then had to leave on urgent business elsewhere. Vladimir Mikhaylovich remained with the visitors. They asked him a highly specialized question. Bodnaruk was somewhat tentative in his reply. He also hesitated on the following question. He understandably was feeling quite uncomfortable at this moment.

After the patrons departed, Vladimir Mikhaylovich gave some thought to his own professional training. He immediately resolved to work on it in earnest. He applied himself to textbooks and reference literature, and he underwent practical training at the station. He is now a specialist 1st class.

Party members have elected officer Bodnaruk party committee secretary several years in a row now. The spotlight is on his every step. Nevertheless he was nervous at this moment: what would the comrades say following his presentation?

Lieutenant Colonel Golovach was the first to speak: "Party member Bodnaruk is taking an aggressive experiential posture. He is familiar with the state of affairs in the company party organizations and with the men's moods and attitudes. He is a sound individual." He then added, gazing straight at Vladimir Mikhaylovich: "Recently this was brought home to me once again."

A sound individual. One can hear from many people this assessment of the party committee secretary.

"Life has taught me a great deal. I try to adopt every positive element from good people," says Vladimir Mikhaylovich, and continues with emotion: "The war

brought suffering to our family as well: my father was killed at Stalingrad in 1943. My mother was left with us four children. I was the youngest...."

Yes, they had a difficult time of it. His mother, Anna Petrovna, a fair and strict woman, devoted herself totally to her children. She taught them to be honest and upright, and to bear adversity with courage. Vladimir's family, his teachers in school, and later his DOSAAF instructors, where Vladimir was enrolled until he entered the military, taught him to value and respect labor and to appreciate the collective.

"My party conditioning," continued Vladimir Mikhaylovich, "I received from the Communists at service school. Company commander Major Andreychenko in particular worked a great deal with me. He also recommended me for party membership. I have never forgotten the words he spoke to me upon graduating from service school: "Work hard. Do not seek the easy road. And remember: an unsown field will produce weeds."

The school of life proved beneficial to party member Bodnaruk. It frequently faced him with the most complex problems, but it required a single solution -- the correct one, because people's futures were at stake. For example, party member A. Kharlamov had a good reputation in the unit. First he brought his platoon to ratings of excellent and, when he was promoted, he did the same for his company. Honor and respect were his due for this. But fame went to his head, and he began putting on airs. His comrades failed to check him in time, however. He began committing disciplinary violations, and this affected the state of affairs in his outfit.

The party committee secretary spoke with Kharlamov on numerous occasions. Vladimir Mikhaylovich talked to him and saw that his words were having no effect whatsoever. He then decided that a group discussion was needed. He requested that leader-Communists and the officer's fellow servicemen attend an expanded meeting of the party committee. Each of them appraised Kharlamov's behavior honestly and in a party-mindedly forthright manner.

Just as Bodnaruk expected, the officer gave serious thought to what had been spoken, became more attentive and composed, and he went deeply into the subunit's affairs.

"It is easy to make mistakes. It is more difficult to correct them," said Vladimir Mikhaylovich. "The main thing is that Kharlamov understood his errors of omission. I believe he will shape up."

It was stressed at the Sixth Armed Forces Conference of Primary Party Organization Secretaries that the party organization leader will do his work successfully if he is modest, principled, democratic, close to others, and accessible to all.

This is an excellent description of party member Bodnaruk. Today as well, in his new position, he devotes himself just as selflessly to the cause of training and indoctrination of aviation personnel. He is bound to the men by a great many threads. These threads hold firm even when party members leave the unit. Bodnaruk receives letters from many of his pupils. They contain

joy and sadness, pride in achievements and plans for the future. Recently, for example, Sr Sgt (Res) N. Kravtsov requested that he recommend him for party membership.

Party member V. Bodnaruk sees his duty as being among the men, sharing their concerns and aspirations.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

BUNDESWEHR ALLEGEDLY IS TRAINING NEO-NAZI KILLERS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 10-11

[Article, published under the heading "Imperialism -- Enemy of Peoples," by Col P. Golovin: "Whom Is the Bundeswehr Training?"

> [Text] The band was playing a peppy march, accompanied by a dozen odd hoarse voices. A group of persons in semimilitary garb, Third Reich decorations displayed on their service jackets, stood by a standard bearing a swastika. Arms rose in the Nazi salute before portraits of the raving Fuehrer and his assistants in robbery and violence. What was this? Had a time machine transported us back to the year 1939, to the beginning of World War II? No, time marches on: it has already cast the broken fragments of the Hitlerite empire onto the ash heap of history. But today, almost 40 years after the defeat of fascist Germany, die-hard Hitlerite thugs are crawling out of various cracks and howling about revenge. And this is hardly surprising, since ruling militarist circles in the FRG, stubbornly following the anti-Soviet U.S. and NATO course, are supporting their aggressive policy, aimed at achieving military superiority over the USSR and the Warsaw Pact nations, and are stepping up measures to implement revanchist, expansionist plans. They hope to achieve their goal with the assistance of the Bundeswehr.

The Bundeswehr is presently becoming NATO's principal striking force in Europe. Approximately half a million officers and enlisted men serve in the Bundeswehr. A program of build-up and modernization of all branches of the armed forces in the FRG is proceeding at an accelerated pace. Ground forces are receiving the new Leopard 2 tank (a total of 1,800 of these vehicles will be built for the Bundeswehr), Fuchs armored personnel carriers, Roland missile systems, plus other military hardware. Plans call for adding more than 100 multirole aircraft to the Bundesmarine. The Luftwaffe will receive Tornado aircraft, which are capable of carrying nuclear weapons, missiles of various types, ground-attack aircraft, and helicopter gunships.

In conformity with the strategic concept of "forward defense," the principal FRG ground forces combined units and units are deployed 50-100 km from the border of the GDR and Czechoslovakia. Aircraft can also reach the border in short order.

In the last two decades a powerful military industry has been established in the Federal Republic of Germany, the scale of which greatly exceeds that country's reasonable defense requirements. West German military concerns have set up production of modern arms, including supersonic aircraft and electronic equipment. Recently the general secretariat of the Western European Union made the decision to rescend the prohibition, established for the FRG pursuant to international agreement, from building strategic bombers, as well as long-range missiles. This decision directly contravenes the Potsdam Agreement, according to which West Germany has an obligation to ensure that war never again begin from German soil. But the federal government of Chancellor H. Kohl, which has permitted U.S. first-strike nuclear missiles to be deployed on that country's soil and which is dragging the FRG into the orbit of U.S. militarist plans, now wants to acquire its own aggressive potential, an objective which is once again being served by the Hitlerite "arms smithy." This intention on the part of Bonn represents a direct threat to peace and security in Europe.

FRG military and political leaders view the Bundeswehr as a NATO striking force and are stepping up efforts to instill in the officers and enlisted men a willingness to fight for the interests of imperialism, first and foremost against the nations of the socialist community. In connection with this, considerable attention is being focused on ideological brainwashing of military personnel. Its principal aim consists, in the first place, in brainwashing Bundeswehr personnel in a spirit of loyalty to the imperialist state and, secondly, instilling in officers and enlisted personnel a hatred toward the socialist countries, particularly the Soviet Union. Therefore anticommunism, closely interwoven with propagandizing the ideas of militarism and revanchism, constitutes the main content of "political education" in the Bundeswehr.

For example, here is what Bundeswehr personnel say about their daily routine: "In the morning you brush your teeth, report to formation, get in a tank, 'advance' to Moscow, eat dinner, 'take' Moscow, clean weapons, present them for inspection, followed by retreat." Indicative in this instance is not the methodology of conducting training activities but rather their ideological support. West German pilots, for example, do not simply do practice bombing, but "bomb" Kiev or Leningrad, preparing them psychologically for combat missions.

West German propagandists extensively employ lies, slander, and falsification for the purpose of brainwashing military personnel. They attempt to portray every decision by the CPSU Central Committee and Soviet Government aimed at further development and improvement of socialist democracy and the economy as difficulties in our domestic policy. They make every effort to ignore and distort the Soviet Union's successes of monumental proportions in development of our nation's economy. Savage attacks are also leveled against the Soviet Army and the armed forces of the other Warsaw Pact nations, hatred toward

which is kindled in every possible way. At the same time considerable attention is devoted to praising capitalism in general and the Bonn state monopoly system in particular.

Both directional thrusts in the ideological brainwashing of Bundeswehr personnel -- anticommunism and praising the capitalist system (that is, anticommunist and proimperialist) -- are viewed as main requirements on all "defense motifs." An elaborate edifice has been created for this purpose. A federal defense council, headed by the chancellor, exercises general oversight over the ideological preparation of military personnel.

A special "internal leadership" service handles this directly in the Bundeswehr. This term is used in the FRG to designate a system of ideological brainwashing of military personnel, which includes theory, practice, and the aggregate of means and methods of affecting the moral-political state of personnel and permeating all major areas of military life and affairs. Hiding behind a mask of alleged objectivity, the Bundeswehr's brainwashing edifice is intensively indoctrinating military personnel in a spirit of anticommunism and anti-Sovietism, devotion to the military strategy aims of the NATO bloc, nationalism and chauvinism. The system of "political education" serves primarily this goal. Its principal content, as stated in the 1979 White Book on issues of FRG security and development of the Bundeswehr, is demonstration of the things of value in the societal system of the Federal Republic of Germany, the significance of and need for service in the military. To achieve this goal, the command authorities recommend utilizing slander against socialism, the assertion that it is "aggressive," and the myth of a "Soviet military threat." The following idea is instilled in West German military personnel at political education classes: "Without the Bundeswehr the Russians would have been here long ago."

Various public organizations conduct extensive and diversified ideological work in the armed forces: alliances, societies, and associations of fellow countrymen, distinguished by their revanchist and reactionary thrust. There are a total of about 600 militarist soldier's associations and societies of veterans of World War II in the FRG. They publish newspapers and magazines with the open support of the FRG Ministry of Defense. Their representatives visit Bundeswehr barracks, where they speak to the soldiers, telling stories and reminiscences about the "glorious combat on the Eastern Front" during World War II, laud the fighting traditions and high morale which allegedly distinguished the soldiers of the fascist Wehrmacht, slander Soviet Army personnel, and appeal for a new campaign into the East. Nazi songs are sung at such get-togethers, portraits of the military leaders of the Third Reich are displayed, and the veterans wear the decorations they received during Hitlerite times.

All this is done with the outright consent of the civil and military authorities. The FRG minister of defense, for example, acknowledged during a farewell reception in honor of Luftwaffe inspector F. Obleser that this pilot, who had been awarded the Ritterkreuz during World War II, was one of his childhood idols. This ace of the Hitlerite Wehrmacht embodies for him "a generation which suffered much, was much and unjustly defamed, but an active, energetic generation which is aware of responsibility." The defense minister

failed to mention that Obleser, just as another Luftwaffe "ace," G. Rudel, machinegunned civilians and hospital trains when they could get away with it. Vandal acts and the beastly cruelty of the fascists toward Soviet citizens and the citizens of other countries occupied by Hitlerite Germany are presented as acts of self-defense, forced by necessity.

The "internal leadership" service uses every possible means to make the Hitlerite soldier out as a superman, to revive the worst traits of the Wehrmacht under the flag of preserving traditions, and to propagandize the cult of force and cruelty, a haughty, scornful attitude toward other peoples, especially the peoples of the socialist countries.

The sinister spirit of the fascist army is also maintained within Bundeswehr barracks. Many of them are named after former Nazi military leaders -- field marshals Rommel and Rundstedt, Admiral Luetens, and others. Some bear the names of cities, towns and localities situated on the territory of the Soviet Union, Poland, and Czechoslovakia, claims on which are made by West German revanchists. So-called "traditions rooms" have been established in military units, in which are gathered on display unit colors, decorations, insignia, and photographs of combat episodes of the "heroic Wehrmacht." The black cross adopted by the Bundeswehr as an identification symbol and the black eagle emblem on colors serve as an embodiment of the succession between Wehrmacht and Bundeswehr. By decision of FRG legislative bodies, military personnel are permitted to wear decorations of the German Imperial and Hitlerite armies.

One of the principal directional thrusts of brainwashing in the Bundeswehr is strengthening of "Atlantic solidarity," which is constructed on a foundation of shameless anticommunist lies. It is drummed into the soldiers that in the face of "Soviet expansion" it is essential to strengthen the alliance with the United States. Talks by U.S. officers are held at Bundeswehr barracks, in which these officers share their "experience" of participation in combat operations in Vietnam and other parts of the world. Exercises, competitions, subunit exchanges, etc are held jointly with the armies of the other NATO countries for the purpose of strengthening the "partnership." In particular, competitions among NATO pilots in Central Europe are held once every two years.

The Bundeswehr chaplain service also takes active part in accomplishing tasks of brainwashing personnel. With the aid of military chaplains, the command authorities attempt to justify the necessity of an arms race and to prepare personnel to wage war against the "Communist enemy."

Movies, radio, television, the military press, the newspapers and magazines of reactionary political parties and organizations are widely utilized toward these same ends. So-called imaginative literature of West German and U.S. origin exerts a pernicious influence on military personnel. Glorifying war as a sport and an opportunity for entertaining adventures and exploits, it instills gangsterism, cynicism, and a tendency toward violence and killing. Books written by former Hitlerites, which glorify the crimes committed by the German war machine in the Soviet Union, are aggressively publicized.

The CDU/CSU bloc of reactionary parties and various neo-Nazi organizations, particularly the National Democratic Party (NPD), are exerting increasing influence on indoctrination in the Bundeswehr. The command authorities do not hinder the dissemination of neofascist ideas among military personnel or their contacts with members of extreme rightwing organizations and groups. Many officers and enlisted men join their ranks. It is no accident that neofascism, as the FRG press notes, determines to a significant degree the moral-political countenance of many military personnel indoctrinated by the Bundeswehr.

Increasing activeness on the part of revanchist elements which has been recently observed in the FRG, elements coming forth with various territorial claims, attests to the fact that the West German authorities are in connivance with the revanchists and do not want to draw lessons from history. Deployment of new U.S. weapons on the soil of West Germany, support by the FRG Government of the aggressive foreign policy of the present U.S. Administration, and participation by government officials in gatherings of revanchist organizations serve to confirm this.

The West European democratic community is watching with concern the provocational actions on the part of revanchist circles in the FRG, which create a genuine threat to peace and international security. The horrors of World War II and the brown shadow of fascism are still fresh in the memory of peoples. For this reason mass demonstrations by peace-loving forces against the deployment of Pershing and cruise missiles -- first-strike nuclear weapons -- in their countries are showing a powerful ground swell in Western Europe, and in the FRG in particular.

The revanchists have a short memory, however. They do not want to recall May 1945, when the calamity which they were intending to visit upon the entire world, and the Soviet Union in particular, befell the revanchists themselves. The entire Bundeswehr ideological machine also passes over in silence the final debacle of the Third Reich. It seeks by all forms and methods of influence to brainwash the soldier masses and to prepare them for war against the socialist countries, showing military personnel only one side of the coin -- that aggression and robbery can go unpunished. But there is another aspect as well. A photograph taken at the end of the war has been circulated throughout the world, for example. A Hitlerite soldier is sitting in front of a smashed artillery piece, his hands clasping his head. He embodies not only the military defeat and total collapse of fascist Germany. He also embodies the fate of an entire generation, consciousness-fogged and deceived by its politicians and ideologues. And this other side of the coin serves as a warning to Nazis, neo-Nazis and revanchists of every ilk.

The adventuristic policy of aggression on the part of the United States and its NATO allies, the arms race, and the perfidious nature of the forces of reaction, militarism, and revanchism oblige us to display unrelenting vigilance and maintain a high degree of combat readiness. "The present situation," stressed CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, at the April (1984) CPSU Central Committee Plenum, "demands of us constant and

comprehensive efforts to ensure our country's security and reliable defense of the peaceful labor of Soviet citizens." This demand applies in full measure to military aviation personnel.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

COMMUNICATIONS PERSONNEL PARTY REPORT-ELECTION MEETINGS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 12-13

[Article, published under the heading "Reports and Elections in Party Organizations," by Col V. Ivanov: "Stability of Successes"]

[Text] Important, critical issues are discussed at the report-election meetings held annually in Air Forces party organizations. Party members in military aviation are presently engaged in a detailed discussion on practical organizational and ideological work aimed at further increasing the vigilance and combat readiness of aviation units and subunits.

"We must realistically evaluate what has been achieved, neither exaggerating nor understating it," stresses CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet. "Only this approach guards against errors in policy, against the temptation to view that which is desired as present reality and enables us to see clearly, as Lenin stated, 'precisely what we have and have not accomplished'." Precisely such an approach characterizes the majority of report-election meetings being held this year in the Air Forces. An objective analysis of achievements as well as unutilized reserve potential, exchange of advanced know-how, and consideration of instructive lessons -- all this, elucidated in the course of the meetings, affirmatively helps improve style and methods of party leadership and helps achieve new successes in implementing the decisions of the 26th CPSU Congress pertaining to further strengthening the nation's defense capability.

In the course of reports and elections party members weigh anew how their party organization, with its characteristic forms and methods, has influenced prompt, timely, and high-quality execution of combat and political training programs, ideological and moral indoctrination of aviation personnel, improvement in their vigilance and combat readiness, achievement of socialist pledges, and mobilizes personnel to honor in a worthy manner the

27th CPSU Congress and the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War.

The following article discusses the work being done by the Communists of the unit in which Maj O. Karpenko serves as party committee secretary.

The roar of jet turbines was no longer heard in the heavens. The "Shchit-84" ["Shield-84"] exercise, which had been observed by USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo. He had high praise for the performance of the Soviet fighting men and wished them additional success in combat and political training and in mastering complex modern military equipment and weapons.

This high praise warmed the hearts of the signal troops led at the exercise by party member officer N. Minakov. It not only expresses recognition of their merits but also the urgent need further to increase combat readiness and improve professional skills.

As was noted at the recent report-election party meetings in the unit's subunits, the signal troops accomplished a twofold task in this past training year -- they achieved further improvement in their specialized training and retrained the young personnel over to equipment which was new to them. This naturally created certain difficulties: it was necessary to seek more flexible training forms and methods.

At one of the battalion party meetings held at the beginning of the training year there was a serious discussion about what Communists can do in order successfully to accomplish current tasks. On the previous day personnel had made tough socialist competition pledges. This placed great responsibility on party members. They made a great many sensible comments and suggestions aimed at improving organization and support of combat training, ideological and political indoctrination work in light of the decisions of the June (1983) CPSU Central Committee Plenum. A good deal of criticism was leveled at certain comrades, who were "divorcing" tasks of political conditioning from tasks of combat training and military indoctrination.

Party committee member Communist S. Butov, who was present at the meeting, particularly stressed in his statements that if a plan is not well devised, reflecting a comprehensive approach to personnel training and indoctrination, there can be no unified, purposeful actions. Party members gave thought to how their work should be organized in the future in order to ensure stable growth of crew combat readiness and to resolve all principal matters pertaining to training and indoctrination of specialist personnel in close coordination.

Implementing the resolution passed at that meeting, the battalion party buro took effective measures to assist individual party members, young officers at the company level, who had an inadequate appreciation of the role of indoctrination work. In individual and group discussions and in the course of theoretical dialogues on the proceedings of the 26th CPSU Congress and other party documents, party members S. Butov, V. Dem'yanenko, and other activists

succeeded in convincing them of the erroneousness of their opinion that ideological indoctrination is the business of political workers alone and that training is just for commanders. Each and every party member is responsible in equal measure for the political, military, and moral/ethical indoctrination of personnel.

This had an immediate effect on improving the quality of the training and indoctrination process. The effectiveness of instruction classes and work with individual servicemen increased. Essentially all Communists in the battalion and Komsomol activists proceeded to work with indoctrination matters. For example, commanders, political workers, engineers, and technicians took active part in preparing a series of specific-topic evening events devoted to the romance of military service, the history and fighting traditions of the Air Forces. In preparing such events, they took into account qualitative changes in personnel and the men's spiritual/intellectual needs, individual proclivities and interests.

Or take, for example, another area of party organization activity -- technical instruction. At the initiative of party members P. Shkel' and P. Klebanyuk, a series of lectures was prepared on theoretical problems connected with mastering communications equipment, and specific topics were defined. Subsequently the most proficient leader-Communists held training classes on these topics. The practice of preparing reports on matters pertaining to advanced communications equipment operation and maintenance methods and tactics was also adopted: commanders of excellent-rated platoons and vanguard companies would present these reports to their men. Practical training classes on the equipment, specific drills, and commander training drills were conducted, applicable to the tasks being performed in a specific mock combat environment. Technical study groups and lecture organizations operated in the subunits throughout the entire year, and competitions for best specialist, best crew, and best platoon were held on a regular basis.

Boosting the men's proficiency ratings was one of the important tasks addressed in the collective. Things were complicated by the fact that the young specialist personnel reporting to duty assignments with the unit had not previously studied in full the equipment with which they would be working. The command authorities and party organization had to improve the method of breaking them in, to devise effective practice drills on the equipment, and innovatively utilize previously amassed experience in retraining. The final word in this regard was spoken primarily by party member-instructors officers S. Butov and V. Matsay, as well as others. This made it possible to train the younger men at an accelerated pace and then to devote full attention to meeting pledges pertaining to boosting personnel proficiency ratings.

The command authorities and subunit party organizations are working hard to ensure that every specialist earns a proficiency rating in a prompt and timely manner, becomes a high proficiency-rating specialist in a year and a half, masters one or two related occupational specialties, and prepares himself to perform job duties one step above his current slot.

For example, subunit commander and party committee member Capt V. Dem'yanenko is constantly concerned with enthusing his men with the romance of military

service and awakening in the men interest in their profession and affection for the communications equipment in their care. The training and indoctrination process is running smoothly in the outfit, and socialist competition on targets and performance standards is being skillfully conducted, especially pertaining to the performance of tactical missions in conditions of enemy employment of mass destruction weapons. Incidentally, Captain Dem'yanenko is a high proficiency-rating specialist, a true expert at his job, who possesses a consummate mastery of the skills of efficient operation of military equipment, who has the ability fully to utilize the equipment's inherent potential in all conditions, even the most difficult.

We should note that the subunit's officers and warrant officers confirmed or boosted their proficiency rating on the timetable specified by socialist pledges. Nor could it have been otherwise, since the organization of commander training and progress of independent training of specialist personnel of this category is rigorously monitored by the unit headquarters staff and party committee.

Party member-officers of the services give the men considerable help in training higher proficiency-rating communications personnel and in mastering related occupational specialties. Take, for example, communications expert CPSU member Lt Col P. Shkel'. When he is at a subunit, he always visits the radio room, chats with the specialist personnel, is ready and willing to answer their questions and to explain any process which takes place in the radio room during equipment operation and maintenance. And he will not leave the subunit until he is sure that he has given the communications personnel substantial assistance in their work.

The unit command authorities and party committee members keep a close watch on the growth and development of young officers from the day they report to their new duty assignment. Working in the company, for example, experienced veterans help the newcomers prepare a week's schedule of training activities, in organizing competition among the men, teach them intelligently to utilize their delegated disciplinary authority, synthesize, publicize, and aggressively incorporate advanced know-how.

Lectures and reports are regularly presented in the company taking into consideration the needs and interests of company-level commanders, talks and discussions on technical training, political and military indoctrination topics are organized, and theoretical and methods conferences are held. In determining their subject matter, the people in the unit endeavor primarily to prevent duplication of what is being done in the commander training system. Lively officer interest was aroused in particular by lectures on the following topics: "The 26th CPSU Congress on Scientific and Technological Advance in the USSR and Equipping the Air Forces With Modern Combat Hardware"; "The Role of Man and Machine in Modern Combat"; plus others. The party committee enlisted experienced party members, staff officers, and engineers to present them.

Another important activity area for the unit party organization is dissemination and adoption of all new and progressive innovations devised in the line units. A school of advanced know-how has been established here. Classes on the following topics have been held recently at the initiative of

headquarters party organization Communists: "Organization of Socialist Competition in the Company on Tasks and Performance Standards -- An Innovative Activity"; "How Should Master-Rated Communications Personnel Be Indoctrinated?"; and "Military-Technical Publicity in the Subunit." They were organized by CPSU members officers N. Minakov, P. Klebanyuk, P. Shkel', and V. Ul'yanov.

Party members -- enrolled in the school of advanced know-how -- are ready and willing to conduct military-technical publicity among personnel. During the period of preparation for the new training year, for example, specialist personnel were presented lectures on the specific features of operation and maintenance of communications gear in winter conditions, and driving specialized automotive equipment at night and in conditions of enemy employment of weapons of mass destruction.

In the period of preparation for reports and elections in subunit party organizations, a great many valuable measures were taken at the training center, in the classrooms, and in the long-range and short-range radio communications training areas. A conference entitled "Performance Characteristics of Modern Communications Gear," held at the nicely-equipped training center, evoked considerable interest among personnel. Posters presented the performance characteristics of radio sets and other communications gear. An interesting discussion was held at the conference on our country's priority status regarding invention of the radio and on the capabilities of Soviet-manufactured communications equipment. After the discussion, persons rated excellent in training performance shared advanced know-how in operating and maintaining equipment in a heavy interference and jamming environment.

The condition of equipment is an important indicator of the degree of combat readiness of signal platoons and companies. At one time things were less than ideal as regards equipment maintenance. There occurred isolated instances of equipment breakdown, premature wear on equipment, test instruments, and motors. Party members ascertained the causes of these problems, which for the most part consisted in the fact that the young specialist personnel were poorly prepared in a technical respect and possessed only superficial knowledge of the rules and regulations governing operation and maintenance of the equipment in their care. It was no easy task for the company and platoon commanders alone to correct this deficiency. It required persistent, joint efforts by all party members. The command authorities and party committee organized a thorough inspection of the operating condition of communications equipment and vehicles. Problems were corrected on the spot, during the inspection. Trucks and radio rooms were provided with lacking instruments, tools, and spare parts. All equipment was reassigned, for the most part to party member officers and warrant officers.

Party activists initiated a campaign to extend time between repairs for radio sets, telegraph instruments, and specialized trucks. Challenge prizes were instituted, in particular a pennant "To the Subunit's Best Specialist" and a trophy for excellent equipment maintenance. As was noted at the party report-election meeting, the lagging companies had pulled themselves up to satisfactory performance by the next totaling of training results.

The unit's Communists also did a good job in preparing for the "Shchit-84" exercise. The party organization made a large contribution to this activity. A party meeting with the agenda "Vanguard Role of Communists at the Forthcoming Exercise" was held in a vigorous and businesslike manner. The keynote speaker and those who spoke in the subsequent discussion presented a great many valuable suggestions aimed at improving discipline and organization in the work of the radio teams and the quality of preparation of the trucks for an extended march.

After the meeting the members of the battalion party buros, unit staff and administrative headquarters Communists set to work in the subunits. They communicated to all personnel the tasks assigned by the commanders, mobilized Communists and Komsomol members for exemplary performance of their job-related duties, and presented substantial reports in the company party organizations and subsequently to subunit personnel.

Discussions were held directly in the radio communication teams and radio rooms on how to operate at the exercise in various weather and tactical environments. Party and Komsomol activists related how aviation communication personnel had operated during the Great Patriotic War, the difficulties they had encountered, and how these battlefront adversities had been overcome. Wall, photo and radio newspapers were put out. All this played a positive role. Communications personnel provided the command authorities with reliable, uninterrupted communications and earned praise from the higher-echelon commanders.

The reports and elections in the party organizations have evoked a strong upsurge in labor and productive activeness on the part of unit Communists. Entering the new training year, they are marching in the vanguard of socialist competition and are inspiring all personnel to honor in a worthy manner the 27th CPSU Congress and the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

DETERMINING PILOT FLYING FITNESS BY SKIN ELECTRICAL CONDUCTIVITY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) p 19

[Article, published under the heading "The Reader Suggests," by Maj Med Serv V. Ryabtsev: "The Diagnosis Will Become More Objective"]

[Text] Flight surgeons have experienced cases where a pilot, who had taken a preflight medical and was given a clean bill of health to fly, would fall ill on the following day.

Very rarely does illness appear suddenly. Usually it goes through a so-called preillness stage. Although the illness has not developed and the pilot feels healthy, he should not fly in such a condition. The examination methods used by flight surgeons in the line units unfortunately do not always enable one to diagnose a preillness state.

Studies in this area indicate that of the many physiological parameters of the human organism, skin electrical characteristics (EKhK) react most sensitively to preillness. For example, according to scientists who have conducted such studies, 3 or 4 days prior to the appearance of objective clinical symptoms of illness, skin electrical characteristics show persistent change. It was this which suggested to us the idea of utilizing them in the flight surgeon's work. Existing methods of evaluating the overall condition of health on the basis of EKhK, however, are too complex and laborious, while the specific nature of the preflight medical examination requires maximum simplicity and efficiency.

In our unit we have worked out a simple method of evaluating the general state of health according to skin electrical conductivity (EPK), measured in the interpalmar lead.

The instrument to measure EPK consists of an M265 microammeter with a 500 ohm internal resistance, 180 ohm shunt resistance, and two electrodes of different metals (copper and aluminum). Together with the biological subject, they simultaneously perform the function of source of electromotive force (emf=0.57 V). The area of each electrode is 100 sq cm. The scale on the measuring instrument (microammeter) is graduated in units of electrical conductivity (micromhos) according to the following formula: EPK=I/emf/E-R,

where I -- instrument current; emf -- current source electromotive force; R -- measuring instrument internal resistance.

The instrument has two ranges: 0-192 and 0-773 micromhos.

Before taking a measurement, the skin on the palms is liberally wetted with a 9-percent table salt solution to create a standard electrolytic medium between electrode and skin. The maximum reading is recorded as the EPK. Measurement time does not exceed 2-5 seconds.

In order to elaborate clear-cut criteria for evaluating a pilot's overall state of health from his EPK, we conducted studies aimed at determining a correlation between general state of health and EPK. It was established on the basis of obtained data (more than 2,500 readings on pilots and more than 3,000 readings on patients with various illnesses) that the experimental points (Figure 1) are described by a direct linear relationship with correlation coefficient Sigma=0.79. The regression equation has the form: y=0.0293x-2.460, where y -- evaluation of general state of health in points; x -- EPK in micromhos.

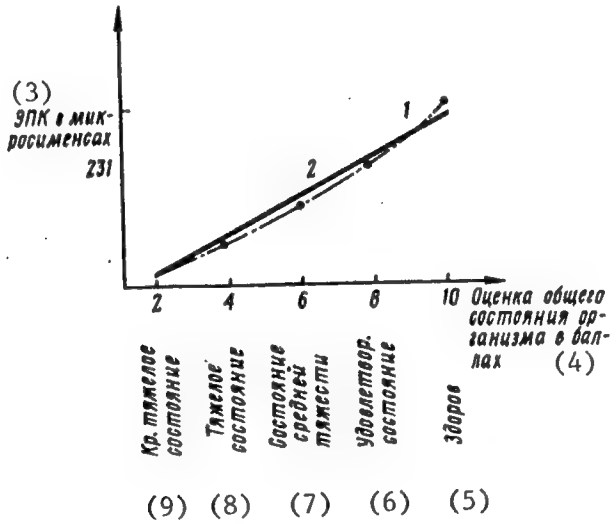


Figure 1. Graph of relationship: general state of health -- EPK (On the X axis -- evaluation of general state of health in points; on the Y axis -- EPK)

Key: 1. Empirical x-y regression line; 2. Theoretical x-y regression line; 3. EPK in micromhos; 4. Evaluation of general state of health, in points; 5. Healthy; 6. Satisfactory state of health; 7. State of medium gravity; 8. Serious state; 9. Extremely serious state

Utilizing this relationship and the principle of the optimal as the basis of functioning of living systems, we calculated a nomogram of evaluation of general state of health (Figure 2).

The clinical significance of the left and right parts of the nomogram from the zone of the norm differs. In evaluating the EPK data one must bear in mind

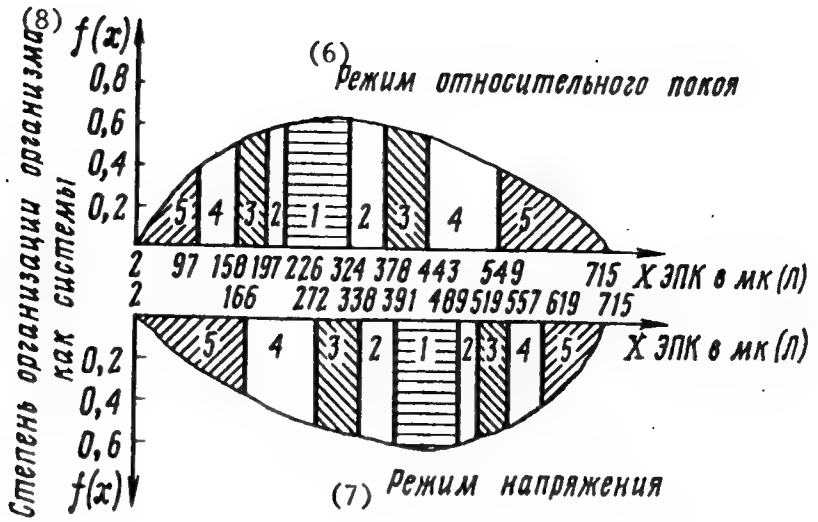


Figure 2. Nomogram of evaluation of general state of health by level of EPK fluctuations

Key: 1. Zone of norm; 2. Zone of adaptation; 3. Zone of preillness states; 4. Zone of pathology; 5. Zone of anticipating states (relationship between degree of organization of the system and EPK is expressed by H-Boltzmann function-A (h); 6. Conditions of relative rest; 7. Conditions of stress; 8. Degree of organization of the organism as a system

---

that the left-hand part reflects a deficiency (diminished intensity of substance metabolism in the skin in favor of vitally important organs and systems), while the right-hand part reflects an excess, that is, activeness of substance metabolism in the skin due to an increase in tone of the sympathetic division of the autonomic nervous system.

As all physical indicators, EPK changes with time, and therefore a single reading will give an estimate of the general state of the organism which is fairly close to the truth. In order to eliminate the influence of EPK fluctuations, it is necessary to take several readings and calculate an average value. For example, during preflight examinations we took single EPK readings. If the reading indicated any deviations in the state of the organism, we would take an additional three or four readings at 5-10 minute intervals, which enabled us to make our estimate more accurate.

Utilization of this method in our unit over a period of several years gives us grounds to state that it has considerable potential for determining that a subject is in a preillness state. Changes in EPK indicating a worsening of the general state of the organism at a time when the pilot felt perfectly well were ascertained shortly before the appearance of clinical indications of acute respiratory affection, tonsillocardial syndrome, just prior to aggravation of chronic gastritis, chronic appendicitis, and one and a half weeks prior to a renal colic attack.

Including the method of evaluating the general state of the organism by EPK in the preflight medical examination eases the task of diagnosing preillness and enables one to improve the quality of flight operations medical support.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

BOMBER REGIMENT INSPECTION, MAINTENANCE PROCEDURES PRAISED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 20-21

[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by Gds Lt Col P. Nosach: "Aviation Engineer Service and Flight Safety"]

[Text] The men of our unit marked the completed training year with a further increase in combat readiness and ideological maturity, improvement in professional knowledge, and strengthening of organization and discipline. Pilots, navigators, and aviation engineer service specialists achieved considerable successes in mastering modern combat systems, operating and maintaining them knowledgeably both on the ground and in the air. This demanded that they work persistently to improve their technical knowledge and tactical skills and demanded an appropriate attitude toward the assigned task, initiative and purposefulness in achieving the stated objective.

Aviation personnel constantly bear in mind the instructions on mastering combat equipment given by USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, in his address at the Fifth Armed Forces Conference of Komsomol Organization Secretaries. They mean a great deal, for precision in bombing, accuracy of missile launches, sure navigation on long cross-country flights, and flight safety depend on flawless preparation of an aircraft to perform the mission scheduled for the crew.

For several years in a row now there have been in our unit no preconditions for air mishaps through the fault of aviation engineer service personnel, and there has not been a single instance where for any technical reason pilots were unable to take off at the time designated by the commanding officer or returned without having completed their mission. This is due not only to the skill of the aircrews but also to the exceptionally conscientious performance of job duties by aviation engineer service [AES] specialist personnel. Implementing the demands of Chief Mar Avn P. S. Kutakhov, commander in chief of the Air Forces, that quality of conduct of technical training classes be improved, we devote unflagging attention to this form. Classes have become more substantial and training topics have become more specific, focused primarily on accomplishing the most difficult tasks pertaining to aircraft maintenance, combat employment, and care. Training classes on special subject

matter, for example, are extensively conducted in this regiment. One specific feature lies in the fact that now we hold such classes directly on aircraft equipment and simulators. This makes it possible more efficiently to reinforce the men's theoretical knowledge.

We should note that in this past training year aviation personnel, including flight personnel, have shown considerably more interest in theoretical subjects. This is connected with the fact that in the campaign for flight safety officers and warrant officers are endeavoring to make sure to spot mishap-potential situations on the ground, in order to prevent unpleasant situations during performance of assigned missions in the air. And a thorough understanding of the substance of the physical phenomena taking place in aircraft systems is essential. Specialist personnel are more conscientiously studying the appropriate sections of textbooks, shop manuals and regulations. Aviation engineer service personnel constantly bear in mind that flight safety depends not only on the aircrew but also on those who ready aircraft equipment on the ground for a mission and who support the pilots' actions in the air.

Substantial results in combat equipment maintenance have been achieved in the subunits in which officers V. Yeliseyenko and G. Solov'yev are squadron deputy commanders for AES. Their men have thoroughly studied the design and construction of the equipment and do an excellent job of servicing and maintaining the aircraft. All categories of training and preparation are carried out in strict conformity with the requirements of regulations and manuals. The men actively utilize process charts and cards, which prescribe effective monitoring and verification of the quality of work performed by each maintenance specialist.

In the past training year we accomplished a fair volume of preventive work connected with quality of preparation of aircraft for flight operations. And we achieved this first and foremost by improving ideological-political and military indoctrination of personnel, growth of professional knowledge, improvement of the prediction and forecasting system, and increasing demandingness on subordinates by aviation engineer service supervisor personnel.

One of the main conditions for ensuring flight safety is prompt and timely determination of malfunctions on an aircraft and their prevention. And the technical state and condition of an aircraft is determined in the process of inspections, routine maintenance and repair. Effective preventive measures are taken on this basis to maintain a high degree of reliability of combat aircraft systems. Successful accomplishment of tasks is aided by extensive employment of flight recorders and modern test equipment possessed by our laboratories.

Flight recorders enable the commanding officer and engineers comprehensively to evaluate aircrew actions in the air, to determine aircraft performance, and to establish the cause of a mistake occurring in the air or on the ground. This is why the unit's engineers devote serious attention to ensuring that flight recorders are in good working order and to furnishing classrooms with special equipment required for thorough analysis of flight performance results and job performance of AES specialist personnel in the process of aircraft

maintenance. This greatly helps in operation and maintenance of bomber onboard systems without errors, in strict conformity with the requirements of guideline documents pertaining to organization and conduct of flight operations.

A thorough and comprehensive analysis of the condition of combat aircraft assemblies and component units and a detailed prediction of factors which have caused various malfunctions play an important role in ensuring a high degree of aircraft reliability. We thoroughly analyze even an insignificant deviation of parameters from normal values. We have our most knowledgeable and experienced specialist personnel predict equipment failures, which enables us to improve on a systematic basis the accuracy characteristics of many aircraft systems. Not only engineers and technicians but flight personnel as well take active part in this work.

For example, Gds Majs A. Adamenko, I. Burtolik, V. Vasil'chenko, V. Potepukh and others have devised a parameters record log for each occupational specialty. Our initiative was given approval and support by the higher command echelons. Similar logs are kept in the regimental technical maintenance unit. Entries record all parameters of aircraft systems and component units during performance of scheduled inspection, maintenance, and repair operations. This material is subsequently analyzed, and conclusions are reached which help improve aircraft operation and maintenance.

Experience indicates that appropriate adjustments must be made in organization of aircraft performance testing and monitoring. Why is this? In the past there have been instances where certain specialist personnel, in readying an aircraft for a flight operations shift, failed to perform all inspection procedures. Some of them, for example, would "forget" to recheck full control yoke lateral travel or to deflect it forward the prescribed number of degrees. And yet an aircraft's control system is very important and requires close attention on the part of ground specialist personnel. Even the slightest problems arising due to failure of a ground maintenance technician to perform full inspection procedures can make things difficult for the aircrew when airborne. This matter was comprehensively discussed in the AES section of the methods council, the members of which recommended to aviation engineer service supervisors that objective monitoring devices be utilized more effectively during aircraft inspections.

Incidentally, the thoughtless attitude on the part of some ground specialist personnel toward bomber control system maintenance compelled us to step up monitoring of its condition in the process of readying an aircraft for flight operations. Now the control system is subjected to a comprehensive objective check prior to every flight operations shift.

A list of specific inspections and tests plays an important role in increasing aircraft reliability. It was devised taking into account the aircraft maintenance experience of our unit and other outfits. A schedule of preventive maintenance inspection and tests on aircraft systems and component units was prepared for each service. On the basis of this schedule the unit's engineers (each in his own area of specialization) schedule maintenance procedures on a given aircraft on a scheduled maintenance day or during

aircraft preparation for a forthcoming flight operations shift. The schedule indicates the date of performance of a given maintenance procedure on the bomber by AES specialists and keeps a record of problems discovered. Some are scheduled by hours logged, and others by climatic conditions.

For example, the condition of hydraulic hoses, control system drives, air intakes, forming of cracks at certain locations, as well as failure of rivets in some instances are determined by hours logged. In certain instances a nondestructive testing method is also employed. We check system gas cavities and the condition of gas protection cylinders and push rods according to climatic conditions and time of year, and we check to make sure that the grease has not solidified in the holder interlock boxes. Sometimes it is necessary to open up the automatic brake adjusting valve and check the installation. Specialist personnel check to make sure it is free of moisture, which can also cause certain aircraft component units and systems to malfunction.

But life moves forward, and aircraft equipment is also continuously improving. This faces engineers with new problems and imposes higher demands on every ground maintenance specialist. As experience indicates, technical information and its prompt communication to aviation engineer service personnel, especially pertaining to malfunctions occurring through the fault of maintenance personnel, are of considerable importance in present-day conditions. We maintain a technical notices file for this purpose, which contains materials on maintenance problems with indication of the causes and factors resulting in the development of malfunctions, as well as recommendations to correct them. Performance of many maintenance process and preventive maintenance operations to correct various problems in the operation of aircraft equipment is accompanied by drawings. This enables personnel to spot problems faster and to correct them promptly.

In particular, lists of typical AES maintenance personnel errors occurring during servicing and maintenance of aircraft equipment have also been prepared for each service. These lists are particularly beneficial when breaking in young engineers and technicians.

Following a thorough, comprehensive analysis of the results of many years of servicing and maintenance of modern aircraft, appropriate adjustments had to be made in the program of preparing young maintenance specialists for working unsupervised. Additional sections were added. They include study of the list of mistakes made by AES personnel in the process of aircraft servicing and maintenance, fire-hazard "points" on aircraft, etc. Engineers devoted serious attention to the most typical malfunctions which can occur due to maintenance technician or mechanic oversight. Other steps have also been taken in the unit which are helping to improve the quality of work performed by aviation engineer service personnel and are helping to increase their technical skills.

Preparing to honor in a worthy fashion the 40th anniversary of the Great Victory over German fascism, aviator-guardsmen are striving in training and

socialist competition to build upon the heroic traditions of the combat veterans and to continue their outstanding patriotic deeds in a worthy manner.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

CORRECT HELICOPTER LANDING APPROACH CONFIGURATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) p 22

[Article, published under the heading "Constant Attention to Flight Safety," by Military Pilot 2nd Class Capt O. Georgiyevskiy: "Landing a Helicopter"]

[Text] Scheduled flight operations were in progress at the airfield. Helicopters were taking off precisely on schedule. Aircrews which had completed their mission were landing.

Sr Lt A. Ivanov's helicopter was on approach glidepath. The pilot precisely maintained descent parameters, and the craft settled smoothly onto the concrete at the calculated touchdown point. Nothing less than a mark of excellent could be given to such a landing.

That day Ivanov went out several more times on various missions, and each flight ended with an excellent landing. The obvious conclusion was that the senior lieutenant handles his aircraft masterfully.

This proved to be far from the case, however. During the next flight operations shift Ivanov came very close to having an accident while landing with a cargo load away from the airfield, into a site of limited size in weather close to minimums. While on his landing approach he dropped sharply, passing dangerously close above a clearance obstacle, incorrectly estimated distance to point of touchdown, and came in hot. Thanks to prompt intervention by the flight operations officer, a hard landing was avoided.

It was subsequently ascertained that in normal circumstances the pilot would reduce speed in time and flawlessly bring his craft onto the ground. In adverse conditions he devoted too much attention to finding the landing site and observing the ground. His well-rehearsed procedures scenario did not help him successfully complete a flight in this situation. Analysis of this incident suggested that during practice flights in VFR conditions a pilot should practice a landing approach into a limited-area landing site or a night landing in IMC [instrument meteorological conditions], where the approach descent glidepath is steeper.

As we know, a helicopter landing approach boils down to proportional reduction of vertical and forward speeds, taking into account wind direction and velocity, outside air temperature, obstacles on the approach path, landing site elevation, and aircraft loading. It is very important correctly to select and calculate an approach descent glidepath. At his home airfield a pilot as a rule performs this phase of a flight in comparatively simplified conditions (outside temperature not excessive, normal takeoff weight, approaches to the field clear of obstacles). In short, landing presents no difficulties. In nonstandard conditions (maximum gross takeoff weight, landing site of limited size, etc) the pilot must have knowledge of the peculiarities of the landing procedure and solid piloting skills. Therefore I feel that during routine flights in the vicinity of the airfield it is advisable to practice with an eye precisely to such situations. In other words, on practice and check flights the pilot should be instructed to make his landing approach on a steep glidepath, at an angle of approximately 25-30 degrees to the horizon.

In my opinion such a landing approach provides certain advantages. A pilot develops an approximate pattern of approach descent procedures when landing in IMC, at night, and off-airfield. The pilot adapts in advance to flying in altered conditions. In addition, with a steep glidepath the pilot has a better view of the landing site, and therefore he more quickly notes a displacement of the intended touchdown point in a vertical plane, and thus can promptly refine his approach and correct his error. In addition, it eliminates premature descent and approach to the touchdown point at excessive airspeed, dangerous lowering of the tail boom, as well as the "pickup" which Mi-8 helicopters sometimes experience. And finally, with a steep approach glidepath the pilot has some reserve height to increase the pilot's options in case of an in-air emergency.

In the process of flying activities pilots develop a certain automatism of actions at various stages of flight. But when landing in specific nonstandard conditions, a pilot must take into account a number of changing factors. In connection with this, under certain conditions automatism may constitute a negative factor and promote multiplication of errors during a landing approach. It is easier to correct such errors on a steep approach glide than with a shallower glidepath. The final approach glide includes bringing the helicopter onto the calculated point of touchdown and refining position in relation to the landing markers; determination of the moment to begin descent, in relation to height, airspeed, visibility, and possible obstacles on the approach descent path; gliding to the calculated point of touchdown with proportional reduction of airspeed and altitude; shifting the main rotor from oblique to axial flow (H=50-30 m for the Mi-8 helicopter); final dissipation of inertial forces at the point of roundout and hover to touchdown (Figure 1).

The glide from point 1 to point 2 is accomplished with proportional reduction of vertical and forward speeds. During this segment of the glidepath the pilot fine-adjusts the roundout point. Decrease in airspeed with height can be monitored, as is indicated in the Table.

In order to ensure that vertical and forward speed diminish proportionally, the glide angle should be at 45 degrees (Figure 2). But at this approach

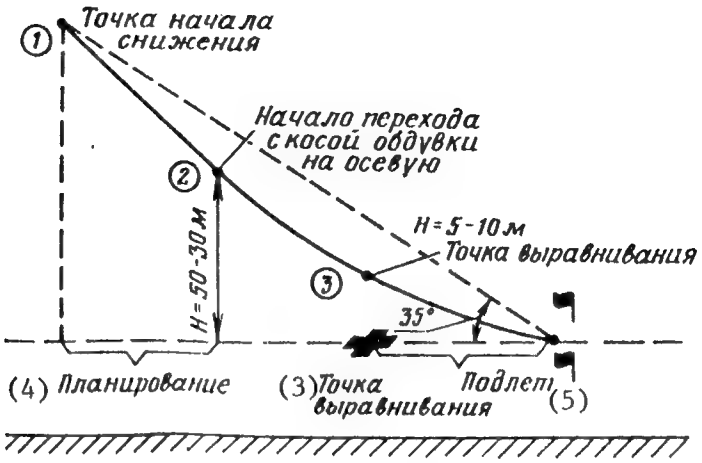


Figure 1. Stages of Helicopter Final Approach Descent

Key: 1. Point of initiation of descent; 2. Beginning of transition from oblique to axial flow; 3. Roundout point; 4. Glide; 5. Hover

V, км/ч	150	120	100	80	70	60	50
H, м	200	150	100	80	70	60	50

angle it would be necessary to reduce speed abruptly at point 1, which is dangerous. In connection with this it is better to set up a shallower glide -- 30-35 degrees. With this descent the helicopter is affected by inertial forces which must be taken into account and reduced in segment 1-2. At point 3 they must be reduced to zero. If this is not done, dangerous lowering of the tail boom and the "pickup" phenomenon are possible close to the ground.

"Pickup" usually occurs as a result of incorrect manipulation of the controls when approaching the landing markers at excessive speed (collective downward, cyclic back). In this case, although the cone of the main rotor (NV) and thrust deflect rearward, inertial forces maximally affect the helicopter (thrust is small, since collective is brought downward). An additional compression zone is created under the main rotor from the advancing airstream, and the rotor increases rpm. The main rotor's automatic rpm maintaining system signals the metering valve to reduce fuel flow. The engines shift to

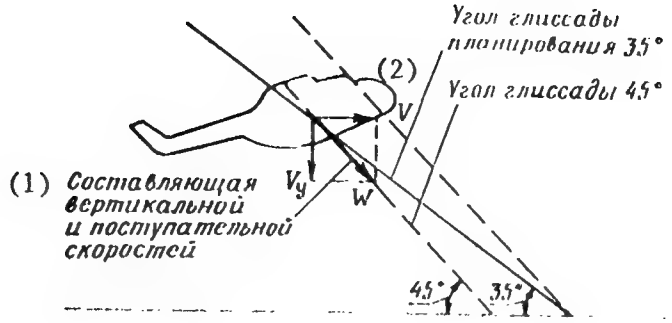


Figure 2. Diagram of forces which characterizes the relationship between helicopter vertical speed of descent and forward speed

Key: 1. Vertical and forward speed component; 2. Approach glide angle

lowered output. The helicopter, picked up by the force of the advancing airstream, holds altitude for a time due to inertial forces. But when they cease to operate, the craft begins dropping rapidly. The pilot can aggravate the situation if he abruptly pulls the collective-pitch stick upward. Drag on the main rotor will increase sharply, while there will be insufficient power precisely at this moment due to delayed gas-turbine engine response. Naturally with a drop in main rotor rpm, the helicopter will descend more rapidly. It may hit the ground hard in a steep nose-up attitude.

It follows from the above that inertial forces should be reduced during glide segment 1-2. That is, using flying terminology, one can state that at point 2 the helicopter should be "on step."

If forward speed is not reduced proportionally to vertical speed, it must first be decreased (cyclic stick slightly back, collective-pitch stick upward). When increasing main rotor thrust, one must bear in mind the response delay of gas-turbine engines and act, as stated above, prior to reaching the specified height. It is 60-70 meters for an Mi-8 helicopter in no-wind conditions.

I believe that these recommendations will help helicopter pilots in their daily flying activities.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

INSTRUCTORS WARNED AGAINST PREJUDICED ANTAGONISM TOWARD CERTAIN PILOT CADETS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 27-28

[Article, published under the heading "Topics of Ethics," by Maj V. Usol'tsev: "Prejudice"]

[Text] Lt Nikolay Bokov was in a foul mood as he climbed out of the cockpit of the dual trainer. He merely waved his arm in response to a question by student pilot Chislov, with whom he had been flying dual instruction: "Would you critique my performance?" On the ramp, noting Aleksey's satisfied smile, he asked in puzzlement: "I don't understand, Chislov, why are you pleased?"

"It seemed to me, comrade lieutenant, that today I flew better than the last time."

"It seemed!" Bokov was about to add a sarcastic comment, but he managed to control himself: "You better go prepare for your next flight."

Depressed, the pilot cadet headed for the scaled-down airfield and flight walkthrough site.

"Well, did Chislov fly poorly?" Maj V. Berezin, squadron deputy commander for political affairs, who had overheard the conversation, asked Nikolay.

"No, he flew fairly well. But not as well as he should have," the instructor shrugged.

"That is no explanation. Precisely what did he do wrong?" the deputy commander for political affairs pursued the point.

Bokov looked at Berezin with an air of perplexity: "Comrade major, I don't even think I can put it into words."

"Apparently Bokov is not yet able to handle the rough edges in the pilot cadets' flying technique," the political worker thought to himself. "After all, this is only his first year as an instructor. Everybody has difficulties

at this stage. I must look into this matter to make sure he doesn't do anything damaging."

Major Berezin decided to study the cockpit flight recorder tapes on Chislov's last two flying days, compare them, and determine deficiencies in the student pilot's flying technique in order to recommend to the young instructor how to correct them. But no matter how closely Vladimir Martim'yanovich examined the tapes, he could find no significant errors in maintaining the prescribed parameters in the future pilot's execution of practice maneuvers. In addition, the flight recorder tapes indicated that Chislov was right: today he had indeed flown better than yesterday.

The deputy commander for political affairs examined all the student pilot's flight recorder tapes, and he noted that the young pilot's flying technique was becoming cleaner from one flight to the next. And on his most recent flight Chislov had earned a solid grade of 4. All this indicated that Aleksey was conscientiously preparing for his training flights and was endeavoring not to make mistakes.

"Strange," the major reasoned. "You would think the instructor would be pleased that his student was doing well, and yet Bokov is irritated. Why? And on the ground before a training flight he does not appear to treat Chislov the same as the other students in the group. He is cool and abrupt toward him. Could there be a personality clash here?"

Vladimir Martim'yanovich discussed the results of his inspection of the flight recorder tapes with the lieutenant. He then asked him: "Does Chislov have a disrespectful attitude? Or is there some problem with his training?"

"No, comrade major. Cadet Chislov is disciplined, efficient, and willing. And he is one of the best in training performance. But there is something about him.... Excessive self-confidence, an accentuated, formal correctness in all things, an exaggerated conscientiousness...."

"Hold on there. This is a very familiar picture, for I had a similar situation during my early days as an instructor," Vladimir Martim'yanovich suddenly recalled. "My error came close to ending things badly...." The deputy commander for political affairs wavered for a moment: should he really tell the young instructor about his past mistakes? He decided that it was necessary. One learns better from the mistakes of others.

"You know," he said, "I had a similar situation."

Bokov gazed at the officer: was he kidding? Major Berezin was one of the regiment's finest instructor pilots and an outstanding methods specialist.

"Yes, when I was an instructor a pilot cadet was practically washed out of flight training due to my prejudice," Berezin repeated.

...For some reason Lieutenant Berezin took a dislike to student pilot O. Sidorchuk from the very beginning. At first he could not put his finger on the reason. Always attired in a neatly-pressed, well-fitting uniform with a

snowy white undercollar, and wearing boots polished to a mirror luster, Sidorchuk gave the appearance of a dandy to the young instructor. Oleg had an independent and dignified air about him: he had completed 2 years of technological institute correspondence study and had worked at a factory in a large city. He received excellent grades. And his classmates frequently solicited his advice. And the fact that they went with their questions not to their instructor but to a fellow cadet hurt Berezin's pride. He saw this as a disparagement to his commander's respect and authority.

But it pleased Sidorchuk that his comrades turned to him. He readily and willingly explained to them complicated questions pertaining to training topics, from time to time casting a glance at the instructor, who was seated nearby. And Berezin saw this as a challenge. In addition it seemed to the officer that Oleg was deliberately adding insult to injury when he would always ask: "Anything else you're not clear on, fellows?"

If there were any more questions, he would conscientiously, painstakingly, and knowledgeably explain the complicated material.

Later Vladimir realized that all this was a result of his injured pride. In looking over at his instructor, Sidorchuk was simply seeking support.

Once Berezin made a mistake while explaining the procedure of executing one of the elements of a training flight into the practice area and drawing a diagram of the forces acting on the aircraft during this maneuver. Berezin spotted it. Vladimir should have thanked the pilot cadet, but he became angry and ordered him in the future to "mind your own business." "Okay, hotshot," the young instructor said to himself with annoyance," let's see how you do in the air."

At the beginning of flight training the student pilot indeed became flustered in the air and performed in a hesitating manner. Instead of offering Sidorchuk support at a difficult moment, instead of helping him correct his mistakes, he would rake him over the coals at flight critique sessions and raise his voice with him. The situation was becoming aggravated, although on the ground the student pilot studied hard, endeavoring to correct on his own his deficiencies in flying technique. Mistake piled up upon mistake.

Many of the squadron's student pilots had already soloed, but Sidorchuk was still flying dual. Becoming totally disheartened, he lost faith in his own ability and was thinking of resigning from the cadet program, since he felt that he was incapable of mastering the flying profession.

Most probably he would have been washed out without the intervention of flight commander Maj N. Dar'in, an experienced instructor and methods specialist. After having a talk with Sidorchuk, he went up with him in a dual trainer.

"Don't lose heart. Your mistakes are correctable," the flight commander encouraged Oleg after they landed.

He had a different kind of a talk with Lieutenant Berezin.

"You have been keeping a good student pilot on dual instruction," Dar'in reproached the instructor. "Of course I too am partly to blame for this: I failed to stop you in time. We shall rectify the situation together. Every new student pilot must be taught as you and I were once taught -- kindly and conscientiously. Otherwise what happens? Instead of a flight critique session there is nothing but harsh criticism. And with what tone of voice do you talk to Sidorchuk? You are doing a fine job of driving out of him any desire to fly, for he has already lost faith in himself and in you as an instructor! You must immediately abandon such methods; otherwise you will not become a genuine military educator."

This conversation was an eyeopener for Berezin. He took a fresh look at his job duties and came to the realization that an instructor should not only teach a student pilot to fly but should also help him believe in his own ability and support him by word and deed at a difficult moment.

One cannot say that things were corrected immediately with Sidorchuk. He continued to make mistakes. But Lieutenant Berezin now did everything he could to help the student pilot and endeavored to instill confidence in him. And the latter, seeing his instructor's kindly attitude, worked hard. He received a mark of excellent on a dual-instruction check ride. Soon he soloed.

Falling silent for a few moments, Berezin said to Bokov: "Sidorchuk is presently commander of an excellent-rated flight and a military pilot 1st class. I recently received a letter from him...."

Vladimir Martim'yanovich said nothing more. He could see from the lieutenant's eyes that there was no need to.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

ORGANIZATIONAL EVOLUTION OF SOVIET AIRCRAFT SERVICING, MAINTENANCE OUTLINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 28-29

[Article, published under the heading "Innovations in Aircraft Maintenance," by Cols A. Lavrinov and V. Smirnov: "Adopting Progressive Innovations"]

[Text] Without mastering amassed experience and know-how it is difficult to adopt new, more efficient methods of servicing and maintenance of fixed-wing and rotary-wing aircraft. In connection with this we should recall the development of the aviation engineer service of our Air Forces and the role it played in supporting aggressive combat operations by the Soviet Air Forces during the Great Patriotic War, especially in the final period of the war.

The crew method of equipment servicing and maintenance was adopted during those years. It consisted essentially in having the bulk of maintenance specialists in crews assigned to each aircraft. The comparative simplicity of the design, construction and equipment of the I-153, I-16, MiG-1, MiG-3, Yak-1, Yak-3, La-5, La-7 and other aircraft made it possible to adopt this method, for these aircraft did not require employment of complex test equipment (KPA), plus the small amount of labor expended on each sortie.

Soon after the war the Yak-15, MiG-9, MiG-15 and Il-28 jet aircraft became operational with the Air Forces. Their servicing and maintenance required using test equipment, since it was necessary to determine changes in parameters, not visually detectable, which affect aircraft performance characteristics. Work on weapons, special and electronic equipment were considered to be the most labor-intensive jobs on aircraft of many types in that period. Therefore the crew method required increasing the number of technical personnel assigned to each aircraft, which inevitably led to uneven personnel work loading as well as to an increase in the quantity of requisite testing equipment and a move away from making a specific individual responsible for a specific piece of test equipment. It became necessary to boost the level of qualification of engineer and technician personnel on an accelerated basis and, what is perfectly natural, to seek more efficient forms and conditions of equipment servicing and maintenance.

At the beginning of the 1950's the so-called group system of aircraft servicing and maintenance was successfully tested in a number of Air Forces

units, where a minimal number of specialists, led by an aircraft technician, remained in the ground crews. All remaining technical personnel were assigned to two AES [Aviation Engineer Service] subunits. One of them began to be called technical maintenance unit (TECh). It consisted of routine inspection, maintenance and repair groups in four occupational specialties (SD [airframe and powerplant], AV [aircraft armament], AO [radar equipment], REO [avionics]). Another subunit was formed of equipment servicing groups in the same occupational specialties. Their job was aircraft servicing and maintenance during preliminary preparation and preflighting, as well as during flight operations. This specialization of technical personnel plus skilled utilization of testing equipment (especially in the aviation regiment technical maintenance unit) made it possible substantially to improve the quality of preparing aircraft for flight operations and to reduce aircraft downtime for routine inspection and maintenance procedures.

The group system of servicing and maintenance went into effect in the mid-1950's virtually in all Air Forces units and combined units which had already begun taking delivery on MiG-19 combat aircraft. This led to further quantitative growth in aviation engineer service personnel in aviation units, as well as to further differentiation of occupational specialties (new MOS included specialists in readying missiles, high-altitude gear, etc). Regimental deputy commanders for aviation engineer service and technical maintenance unit chiefs became the direct supervisors of technical personnel in their subunits, bearing full responsibility for the training and indoctrination process, performance of job-related duties, organization and military discipline of their subordinates.

There were also other forms and methods of servicing flight operations. For example, there was in operation a so-called base support system, whereby a substantial portion of engineer and technician personnel, including technical maintenance units, as well as servicing groups were transferred over to independent airfield technical maintenance battalions. Such an ATB (Aviation-Technical Base) handled several tasks at the same time: it provided logistic, airfield, and aviation engineer support to the units based at a given airfield. The ATBs were not extensively adopted, however.

The group and group assembly-line systems of servicing and maintenance were subsequently developed. But these systems also failed to go into practical utilization.

In spite of this, however, for many years the aviation engineer service successfully provided support services for accomplishing all combat training tasks.

Modern aircraft development imposes special demands on organization of aviation engineer support of flight operations. Third and fourth-generation aircraft possess even higher performance characteristics and more complex equipment, which is distinguished by integration of systems and units. This led to the establishment of various routine inspection and maintenance groups equipped with comprehensive testing and monitoring devices (type KSK). The very first experience at operating KSK, however, indicated that at the squadron level it is virtually impossible to maintain permanent maintenance

teams due to the high personnel turnover rate. For this same reason it is difficult to achieve a high degree of maintenance team professionalism, since aviation personnel are too frequently assigned to other jobs. In addition, as a rule, KSK in the squadrons would be utilized as an electric power source.

In the Odessa Military District aviation unit in which officer Yu. Bragin served as deputy commander for AES, four KSK teams each were set up to monitor the state of aircraft equipment. They were integrated into non-T/O instrument monitoring groups and were subordinated to one of the unit engineers (subsequently group chiefs were placed in charge of them). Special methods instructions for performing instrument monitoring and inspection procedures were issued in order to ensure normal functioning of the groups. The instructions prescribed inspection checks with KSK in the following instances: during inspection of aircraft by AES supervisory personnel, during periodic inspections pursuant to the Uniform Technical Maintenance Regulations, after 50, 100, and 200-hour scheduled maintenance, upon commencing alert duty, etc. The group ranking NCO prepares an inspection schedule based on the monthly schedule, which is approved by the unit deputy commander for AES. Extracts of this schedule are sent to the squadrons and regimental technical maintenance unit, on the basis of which the subunit deputy commanders for AES schedule the pulling of aircraft for maintenance inspections.

Thus the separate non-T/O instrument inspecting groups, under the unit deputy commander for AES, demonstrated their advantages. Just what are these advantages? First of all, they include a high degree of aviation personnel job proficiency due to the fact that they specialize exclusively in a single job configuration -- aircraft equipment inspection and testing. Secondly, in this case information on aircraft equipment malfunctions is always of an objective nature, since the members of a given maintenance team have a stake in an objective evaluation of an aircraft's condition. Thirdly, the presence of such a group in the unit ensures that it operates in a systematic and orderly fashion in all squadrons. In addition, if one or two pieces of KSK equipment break down, the group NCO in charge can shift test equipment around, which is impossible if the KSK is under the squadron deputy commander for AES. Fourth and finally, there was an improvement in the quality of servicing and maintenance of the specialized KSK instruments and equipment themselves.

Practical realities have suggested another innovation: the urgent need to add to the KSK group airframe and powerplant specialists (although the KSK does not include airframe and powerplant inspection devices). In the aviation unit under discussion it would be the most experienced flight technical maintenance unit chief or A&P engineer.

We shall cite the following as an illustration. By decision of unit deputy commander for AES Maj Yu. Bragin, A&P specialist Sr Lt O. Nezhizhim was included in the instrument testing group. This young officer set about enthusiastically and with serious application to master what for him was a new job activity and soon began taking part in aircraft equipment inspections. During one such inspection Senior Lieutenant Nezhizhim, with the aid of a special instrument, detected tiny traces of metal, almost invisible to the naked eye, on the walls of the jet exhaust nozzle. An examination indicated that these were metal particles from failing turbine blades. This

resulted in averting an in-air engine failure which could have had serious consequences.

What useful contribution was made by the work experience of the airframe and powerplant specialists in the instrument inspection group? First and foremost there was an increase in the number of skilled inspections in the period between scheduled maintenance. For example, the maintenance specialists in the unit in which Maj Yu. Bragin is deputy commander for AES discovered several different problems in airframes and powerplants during periodic inspections over the course of a single year. They now had an additional opportunity in the process of airframe and powerplant inspection to check the promptness and correctness of entries in the periodic inspection log pertaining to servicing bulletins, as well as completeness of special-purpose inspections. We should note that this does not duplicate the work done by the flight technical maintenance unit chief or squadron deputy commander for AES, but on the contrary supplements it, leading to a uniform record procedure. In addition, specializing in maintenance inspections of units and assemblies, and therefore acquiring experience in evaluating the condition of aircraft equipment, these specialists become indispensable assistants to unit airframe and powerplant engineers.

On the whole the operating experience of the instrument maintenance inspection groups in our district's forces has indicated that the KSK type inspection system has considerable potential for further modernizing the entire aircraft reliability information system, which is of considerable importance at the present stage in its development. The fact is that the existing information and recordkeeping system, based on preparation of equipment failure record cards, is purely subjective. We shall state quite frankly that technical personnel have too little time to fill out these cards in a thoughtful and complete manner, for which reason they are filled out hastily and, as a rule, for minor malfunctions (an indicator lamp or fuse has burned out, etc). All higher AES echelons are supposed use this "information" in analyzing aircraft reliability. Naturally measures planned and scheduled by them on the basis of such information will scarcely lead to positive results.

At the same time KSK provide recording of equipment failures with utilization of punched cards, which makes it possible to machine-process primary information (directly on a computer). Such information is objective, fairly complete, and is in conformity with the contemporary development of aircraft equipment. The work experience of our aviation subunits clearly confirms the advantages of this system over others, and it is already rendering effective assistance to engineers in analyzing the state and reliability of combat aircraft.

I believe that if the capabilities of the instrument maintenance inspection group are expanded, such a subunit within the unit AES system would play a more effective role in ensuring reliable aircraft operation and flight safety.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.
3024
CSO: 9144/194

CHANGES IN THIRD-GENERATION FIGHTER TACTICS CONSIDERED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 30-32

[Article, published under the heading "Tactics and Simulation," by Military Pilot 1st Class Col Yu. Kislyakov and Col V. Dubrov: "New Features of Air Combat"; concluding part of four-part article, see AVIATSIYA I KOSMONAVTIKA, Nos 9-11; based on materials published in the foreign press]

[Text] 4. Combat Formations

Combat formations have not changed appreciably with each new generation of fighters. "Line abreast," "echelon," "vee," "column," and "stack" have passed through the years and wars. The requirements on a combat formation also remained firm. The principal requirements were the following: ease of control and capability of fast formation change with a change in the situation, securement of all-round visual observation and long-range scan, reliable interaction (mutual support), and freedom of maneuver (antifighter and antiaircraft-evasion).

But what changed in the combat formation? Of all its definitions, which differ little from one another, the definition "disposition of forces prior to battle" is more applicable to fighters. New features can be detected in this disposition. But before describing them, it is advisable to note one persisting tendency: constant dispersal of the combat formation. In practice it is manifested in the fact that aircraft brought together into a group to carry out a combat mission are moving further and further apart from one another just prior to combat engagement. This is due to a steady increase in speeds and altitudes, the spatial scale of maneuver linked to these greater speeds and altitudes, as well as increased capabilities of airborne weapons and modes of attack.

When an aircraft equipped with a single machinegun fired at 50 meters, and its turn radius was approximately the same, combat formations (according to today's measure) were close. A cannon could hit an air adversary at a range of 150-700 meters, and a heat-seeking missile at an even greater range. The turn radius was correspondingly commensurate with these figures, while combat formations were considered open. They were characterized by the capability to maintain visual contact between aircrews and were subordinated to the

requirement of continuous fire support. As was reported abroad, an additional demand unexpectedly arose in the war in Vietnam: to prevent two aircraft from taking a hit from a single surface-to-air missile. In order to meet this requirement, it was necessary to provide freedom of missile evasion maneuver, that is, to allocate additional airspace.

In an open formation a wingman no longer could repeat all his leader's maneuvers in a single plane and not lose him from view. The rules and procedures of redisposition within a group were revised, and echelon shift on a turn began to be practiced, and even shift of roles during an attack (in a situation requiring immediate response the wingman, positioned closer to the adversary, would attack him first).

Combat experience had shown that in the process of vigorous maneuvering it is very difficult constantly to maintain fire coordination in a two-ship element. It was necessary for foreign experts to devise standard tactical devices permitting a temporary break in fire coordination with subsequent "scheduled" restoration. Thus a first transition from open to dispersed combat formations was clearly in evidence.

The foreign press noted that deliberate dispersing of aircraft beyond the limits of visual contact prior to combat engagement was characteristic of third-generation jet fighters. Otherwise it was not possible fully to utilize the capabilities of a new weapon -- medium-range guided missiles. Mutual fire support and even tactical coordination proved to be threatened, however. New problems arose in theory of aerial combat. In relation to the principles of structuring a combat formation, they were formulated as follows: a pair or a single aircraft?

Advocates of the concept of the "single aircraft," rejecting the aircraft pair as an "element," linked their views with the trend toward dispersing the combat formation, which had gained additional momentum. Grounded on technical advances, it was to lead not only to minor but also to major reconfigurations in tactics. Indeed, the striking power of a single aircraft had become sufficient to defeat a single air adversary in a single attack. Wingman fire support was no longer required. The capabilities of the wingman as a shield had also come into question, for he was no longer capable of reliably protecting the leader, of screening him with interdicting fire when threatened by attack from medium range. In addition, in the role of shield or screen a pilot was not fully utilizing his offensive capabilities and increased fire potential. Foreign experts focused on tactics: single-aircraft engagement, exchange of attacks in arising duel situations, and long-range crossfire, whereby he who first opens fire has the advantage. In order to win it is necessary to spot the adversary sooner and to fire a missile sooner, catching the adversary unprepared to defend. Foreign experts recalled that similar tactics had been employed by archers in past centuries. It was best to hit the adversary with a heavy bow when he was in a static position or during straight-line movement to contact. The archer would avoid abrupt movements (maneuvers) in order to be able to ready his bow and aim.

Advocates of the "pair" held the position of traditional tactics of fire and maneuver. They maintained that conditions were not yet "ripe" for

simultaneous, separate, but mass engagements by single aircraft. This was a thing of the more distant future -- a time of all-aspect long-range weapons launched in all directions, including rearward. "Static" air combat with delivery of fire at the adversary from maximum range for the time being was connected with possible escalation to close-range combat. And in close-range combat a pair is always more effective than two separate aircraft. Therefore the principle of "shield and sword" will change but not wither away. Air combat will remain group combat, will remain common combat for the two-ship element, and the threads of teamwork and coordination will not slacken.

The experience of the most recent military conflict in the Near East, in which third-generation fighters took part, brought partial clarification to the issue. Two types of engagement stood out in clear relief, which were directly affected by the performance characteristics of the weapons employed. Close-range maneuver combat was fought by lightweight F-16 fighters, while medium-range combat was fought by F-15 "air superiority fighters."

The F-16 did not carry medium-range missiles or the requisite radar, and therefore experts did not find new elements in these fighters' combat employment and disposition of forces. Modes of combat were grounded on the pair principle, and a temporary break in fire coordination was permitted, while retaining tactical coordination.

F-15 fighters were viewed by foreign experts as bearers not only of new weapons but of new tactics as well. Advocates of the concept of the "single aircraft" were counting precisely on the F-15. Once again a group was operating, however, although with an altered disposition of forces, it is true. One aircraft continued to work in coordination with another, covered the other's weaknesses, coordinated maneuver, and supported engagement. Aircraft not only dispersed but also closed at certain stages of a combat sortie. This was required by the plan (battle scenario), which specified deceiving the adversary regarding the group's numerical strength, more reliable protection of the aircraft by radar jamming, as well as rapid penetration of air defense in a narrow sector together with the escorted bombers.

After a practical test foreign experts reached the conclusion that for the time being the pair principle of formation structure was inseparably linked with the fate of close-range group combat. The pair will remain as long as close-range combat continues. At the present time it is the key to increased survivability and the capability of instantaneous exploitation by the wingman of an advantage gained by the leader, or vice versa. Air combat at medium ranges is advancing on close-range combat and is becoming both quantitatively and qualitatively strengthened in fighter tactics. It is not yet becoming predominant, however. The inevitability of bringing modern aircraft into a group (even in medium-range combat) is due to the performance of such extensive mission tasks as escorting groups of strike aircraft or protecting troops against massive enemy air attacks. Group tactics, however, by no means exclude modes of individual fighter employment, especially in instrument meteorological conditions, at night, or when "hunting." Therefore we have both the pair and the single aircraft. When hardware becomes more complex, tactics cannot be simpler.

Foreign experts note that the most recent local wars have stated an additional question. It is briefly formulated as follows: a flight of three aircraft? The foundations are not undermined thereby either for the two-ship element or the single fighter. A similar disposition of forces prior to combat had been practiced repeatedly in the past, although no final evaluation had been made.

As we know, three-aircraft flights were employed up to the beginning of World War II, after which they yielded to the more progressive pair configuration. In the middle of the war, however, squadrons began containing not two but three groups of the following tactical tasking designation: strike, cover, and free maneuver. The free maneuver group performed various functions, and it usually contained aces capable of quickly assessing the situation and making an independent decision. The actions of this group were subordinated to the interests of the other two. In a three-tier formation ("etazherka") it would be positioned above the others -- at the third level, and had the best field of view and the greatest kinetic energy.

In the war in Korea U.S. jet fighters, in addition to a four-aircraft flight, employed a group of six. The two traditional pairs (shield and sword) were augmented by a third, the functions of which were borrowed from the experience of World War II: free maneuver, build-up of the efforts of the "sword" in the attack and the "shield" in the defense. Not only experience alone, however, dictated the necessity of employing a three-element formation. The presence or absence of information on the enemy received from command and control facilities equipped with radar surveillance gear had become an important factor. When a group of six was in visual contact from a command post, the disposition of forces in the air and engagement would be accomplished according to the prior-devised scheme. Radar surveillance, however, did not always cover the entire area of combat and would periodically break down. In this situation fighters would obtain their own information.

Self-contained flight, which was not considered a rare phenomenon in tactics, imposed additional demands not only on organization of independent search. It was necessary to deploy fighter forces in such a manner as to exclude the possibility of surprise attack by the enemy. A flight in the search phase would usually form up in line abreast. There was good visual coverage of the forward hemisphere and the flanks, but a "blind" sector formed to the rear. An unexpected attack was most probable from this sector. A pair added to the flight would "close" this sector and ensure all-round observation. This made the formation of the six-ship element unusual, since the "vee" pointed to the rear (which gave rise to the name "reverse wedge").

The "rear" pair was included not only in order to ensure all-round visual observation. When there was a threat of attack from the front or flank, it would build up the efforts of one of the forward pairs in the defense, taking up a "shield" position. It would also support it in the attack, handing over the functions of free maneuver to the flank pair, which remained on the outside of the turn and would proceed upward. When necessary the formation would quickly assume the form of a normal wedge or vee, whereby space would be open for redisposition and execution of maneuver. Naturally a six-ship formation could not maneuver as freely as a flight, but in this case the

somewhat unwieldy nature was compensated by advantages in search. It also provided better protection against hostile fighter attack.

The three-element formation was adopted by modern fighters equipped with increased-range weapons. In place of a pair, however, a single aircraft remained in each formation element. The "single aircraft" concept exerted its influence, rejecting the wingman in the pair as a shield. Each element possessed sufficient offensive potential, but its functions did not always terminate with an attack. Only the strike aircraft retained its former functions. Its position within the formation configuration would be selected figuring on achieving maximum concealment and ensuring closing with the adversary on a head-on course.

The two other aircrews in the dispersed three-ship element did not have permanent tactical duties. A great deal, just as with the six-aircraft formation, depended on the availability and completeness of information on the air environment.

Lack of information made it necessary to conduct a combined independent search and to have two aircraft at the same time move forward of the strike aircraft (each maintained surveillance on "its own" hemisphere with its airborne radar). The formation was reminiscent of the "Korean" reverse wedge, but more extended in space. When the mission was being flown within the limits of friendly radar coverage, one of the aircraft would remain in active reserve and would be tasked with building up effort as the situation required. The two others dispersed, not frontally as in the past, but by altitude. The upper aircraft performed the functions of battle engagement and responded to the instructions of the command facility controlling the mission. The strike aircraft did not change its position -- it was positioned below, maintained concealment from enemy observation, and was prepared to launch a surprise missile attack.

Thus the presence or absence of information directly affected the group's quantitative composition. The principle of economical expenditure of forces, which had "become more expensive" along with aircraft hardware, came into its own.

A special place in the tactics of U.S. second-generation fighters was assigned to diversionary actions and feints. This was a consequence primarily of deficiencies of radar-guided weapons, the effectiveness of which depended on continuous illumination of the target by airborne radar in the process of closing and attack. As foreign experts noted, improvement of weapons and implementation of the "fire-and-forget" method (active guidance in the terminal segment) reduce the need for diversionary actions and feints, but do not eliminate it from fighter tactics. It is not efficient to employ in a secondary role an aircraft armed with modern weapons, and therefore remotely-piloted vehicles (RPVs) began performing this task. It was difficult, however, to combine their employment with the plan of each air engagement, and they operated only in the close-in zone, adjacent to the line of contact.

At considerable depth decoy actions were also undertaken by manned reconnaissance aircraft, drawing enemy fighters to themselves. Their mission

was limited to creating favorable conditions for engaging friendly fighters. This tactic is not new either, but previously it had been performed by fighter aircraft of various types: highly-maneuverable fighters armed with light weapons would be assigned to a decoy group, while fighters armed with radar-guided missiles formed the nucleus of the strike group. Elements of the old were clearly evident in each tactical device or mode of action. This emphasizes the need to study past combat experience and to utilize in a practical manner all elements which remain relevant today.

Thus the combat formation had become not only dispersed but diversified as well. Representatives of different tactical air components were working in coordination within the framework of a single air engagement plan, whereby reconnaissance aircraft might perform their own mission alongside acting as decoys, while fighters would coordinate with them their intentions in place and time. Mobile elements, comprising a complex battle model, were separated in space.

Lightweight fighters with limited-range weapons were assigned to the first echelon, while the expensive "air superiority fighters" remained in the second echelon. Efforts were built up in situations permitting employment of medium-range missiles (saturation of limited airspace with a large number of maneuvering aircraft was an obstacle).

First-echelon fighters were no longer limited to the feint or decoy role, but would themselves engage in close-range fluid combat, utilizing information from an airborne command post to place themselves into a tactically advantageous position. A characteristic feature of their tactics was the low-level approach to remain undetected and a surprise attack. In the attack they counted on improved heat-seeking missiles launched at a larger angle of approach.

Reviewing the experience of the most recent air engagements in the Near East, foreign experts note that one must approach it critically. As the magazine AVIATION WEEK stated, clear, sunny weather and a technological imbalance between the opposing sides helped in configuring formations which were dispersed frontally and in depth and in forming echelons consisting of aircraft of different types. The weather did not tend to change and was a constantly operating factor in modeling tactics. In the opinion of this magazine, difficulties in implementing the obtained experience can be seen immediately after it is transferred to the conditions of Europe. Limited horizontal visibility, cloud cover and rain will constitute major obstacles in the path of adopting tactical improvements which proved effective in the skies over Lebanon and the Golan Heights. The very fact, however, that the new fighter formations had been employed in practice and quantitatively evaluated demands due attention.

Foreign military experts, who had followed the employment of new aircraft in local wars, evaluated as follows changes in the disposition of fighter forces just prior to battle.

First of all, it went beyond the framework of conventional notions of combat formation as the disposition of aircraft in a group with specific spacings

laterally and in trail. The necessity of dispersing aircraft in depth, frontally, and in altitude broke beyond this framework. Demands on the combat formation remained, however, and they had to be met in sharply altered conditions.

Secondly, there are limits to the tendency toward dispersal. They are determined by the retention of coordination between formation elements. The most recent air combat over Lebanon (as all previous battles) indicated that a fighter which took off as part of a group but which found itself alone and having lost contact not by design, would usually leave the battlefield.

Thirdly, in most cases dispersal of a group linked by a common tactical plan presupposes maintaining stable command and control. Autonomous (that is, independent, conducted in the absence of information on the air environment from external sources) actions are reserved for "hunters."

Fourth, it is impossible to prescribe and provide for all possible combat formation changes at all phases of a fighter's mission, including air combat. Disposition of forces prior to engagement, however, is responsive to standardization, and therefore it is not only desirable but necessary to model this phase. At the output of the modeling process it is advisable to have an optimal group (aircraft) engagement variation, which depends directly on the selected mode of accomplishment of the combat mission.

Fifth, one's attention is drawn by the three-ship formation (corresponding to conditions of combat at medium range) as a pointer to the future. The evolution of the three-element formation is interesting. A squadron (three flights) divides into three groups: strike, cover, and free maneuver. Then we have the six-ship element (with numerical strength halved) with only one aircraft maintaining its former tactical designation (strike functions). The cover mission in combat at medium range is discontinued, and the two other aircraft are retasked. One of them, however, most frequently functions as active reserve, reinforcing the offense or defense.

Recent experience indicates that "old" combat tactics and modes of action, which have been put to the practical test in the crucible of war and have demonstrated their effectiveness, do not entirely wither away. New ones are born on their foundation, more in keeping with the altered environment and capabilities of improved hardware. And in order to gain victory, the combat pilot should constantly add new knowledge to his tactical arsenal, in order to be able to counter the adversary at any time with his own more effective tactics.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

IMPORTANCE OF AVIATION ENGINEER CADET SENIOR RESEARCH PROJECT STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 36-37

[Article, published under the heading "Military Educational Institution Affairs," by Col A. Zotov, department head, Tambov Higher Military Aviation Engineering School imeni F. E. Dzerzhinskiy: "The Senior Project -- Mirror of a Graduate's Preparedness"]

[Text] The graduates of our service school are not only military specialists with a specialized higher education but also persons who are totally dedicated to their people and to the Communist Party, who clearly see its political goals, and who actively implement its ideas. They are focused toward excellent knowledge of the tasks and organization of aviation engineer service, the rules and procedures of aircraft maintenance, and are capable of organizing and personally carrying out all types of preparation of aircraft for flight operations. The future officers study many subjects in order to acquire knowledge and the necessary qualities: social sciences and military subjects, general engineering, military-tactical, and specialized military subjects.

As practical experience indicates, lieutenants who possess a large stock of knowledge, who possess initiative and creativity, as a rule more rapidly complete the breaking-in phase and subsequently successfully handle their job duties. We are justly proud of such graduates. They include engineers officers S. Andreyev, V. Reznikov, V. Bazhan, A. Besedin and others, who have done an excellent job in their duty assignments after graduating from service school.

The five years it takes to obtain a diploma are difficult ones. Thousands of hours of course load -- lectures, seminars, labs and group classes, practical activities, course projects, and practical training in line units. Dozens of tests and examinations, guard duty, details, and all kinds of activities above and beyond the scheduled curriculum. All this unquestionably demands of the cadets maximum output and enormous exertion of physical, spiritual and intellectual energies. But this is a fine school of maturation along the road to a position of responsibility in line units.

Defense of the senior thesis is an important event both for the school and for the cadets. A neatly-bound research paper is placed on the desk of the chairman of the state examining board, drawings are displayed, and a presentation on the subject of the research paper begins. Each and every point is substantiated and backed up by calculations. Precise answers are given to questions put by the members of the state examining board.... Last year aviation engineers Lts V. Solenyy, M. Bogatyrev, V. Filippov, S. Rafikov, G. Petrov, N. Zenishchev, Yu. Vikhirev, Yu. Fomichev, Ye. Klimov, O. Babin, T. Gorbylev, V. Turmakayev, and others did an excellent job of defending their senior theses.

Their success is grounded first and foremost on thorough mastery of the course material and assimilation of primary knowledge and skills during tour of duty in line units. The senior project adviser also plays an exceptionally important role in the cadet's development as a specialist. Assigning a senior project topic, formulating a problem, getting a student working on a computer and on experiments, and preparing him for a tour of duty in a line unit all demand considerable ability and experience as well as considerable attention and patience. The thesis is performed successfully and in a timely manner if the instructor is a genuine mentor and comrade to the student. One of our school's finest military educators, for example, Senior Instructor Lt Col V. Voytsekhovskiy, keeps close tabs on progress and discipline in the group under his tutelage. By the third year he fully reveals the aptitudes and abilities of the future aviation engineers. He organizes his subsequent work on this basis. It is no coincidence that his former senior thesis students have done well in their practical activities. Lt S. Alpatskiy, for example, is now enrolled in a research engineer academic curriculum, while Lt Yu. Bazhan, who received a final mark of excellent, received a promotion in his first year of active duty.

Experience indicates that a successful senior thesis project is fostered to a significant degree by cadet participation in scientific research work and in the activities of military scientific societies. Such activities not only do not hinder studies but augment them. Cadet V. Solenyy, for example, began engaging in scientific research work in the third year. He presented decent reports at a conference of the school's military scientific society, at department military scientific society meetings, and he wrote an article on a student research project contest. His research results went into a scientific research report and were skillfully utilized in his senior thesis. Cadets V. Tumakayev and Ye. Botsunov, who defended their senior theses with a mark of excellent, worked in like manner. Few students, however, are being drawn into scientific research work. This deficiency should be corrected.

An important component part of the senior research project is substantiation of the place of a given engineered assembly within the overall structure of a given installation and the place of that installation in the overall radio equipment or weapon system. Tours of duty in units under the supervision and guidance of knowledgeable officer-specialists who love their jobs help successfully accomplish this task. They are ready and willing to share their experience and know-how, and they help the students with practical advice. Lt Col V. Tarasov and Capt V. Bolobko, for example, once actively helped seniors with their thesis projects during their tour of duty in line units. A plan

for scientific and technical cooperation with the school has been devised in the unit in which they serve. It specifies various joint measures by aviation engineer service specialists, instructors, and senior-year cadets.

Experimentation plays a very important role in preparing the senior thesis. Statement of the problem and formulation of an experiment plan and layout, selection of instruments and equipment, adjustment of circuits, investigation proper, summarizing and interpreting experiment results -- these are the stages covered by a senior-year cadet performing an experiment. And each stage has its own specific features, while overall the student develops independence and initiative, and he gains a thorough grasp of the strong and weak points of the system he is designing. It is not mere happenstance that many experimental solutions at times border on inventions.

Nevertheless the total number of experiments involved in the senior thesis project is still small, comprising only one tenth of the overall total volume. There naturally arises the question of improving experiment facilities, which in each subject would make it possible to investigate a broad range of questions, some of which will form the nucleus of forthcoming senior research projects, while preliminary experiment results can be the subject of discussion at conferences of military scientific societies and be placed on the scientific research activity agenda.

An experiment can be continued while serving in line units. This is especially important, since in the course of operation and maintenance of aircraft equipment there sometimes arise practical problems which demand scientific investigation. As we know, today's aviation engineer is first and foremost an investigator, who routinely deals with equipment, parameters, and performance characteristics, that is, with everything which a cadet encounters in the process of experimentation. Meriting attention in this regard is the experience of instructor Lt Col Yu. Yakushev. In the cadet design office he heads, the future officers are always working on engineering problems, seeking ways to solve them. The senior research projects they submit contain persuasive experimental data.

In recent years engineer design specialists have been devoting considerable attention to a systems approach to design, which consists essentially in the interaction of the systems sciences with technical systems. The science of systems pursues the objective of creating and studying the most general methods of analysis of large systems, independent of their physical nature. Design based on these concepts is called optimal and is characterized by application of synthesized criteria and mathematical models. Unfortunately only isolated elements of optimal engineering design can currently be encountered in senior projects. For example, mathematical models were devised by senior cadets Ye. Klimov, Yu. Vikhirev, O. Babanin, and V. Semenov. Unique problems were solved on the computer in the senior thesis projects of cadets V. Solenyy, V. Tumakayev, A. Solodkov, and V. Chesnokov. For the most part, however, such models were lacking in senior projects, although they would have been highly appropriate according to the conditions of the problems being solved. Computer utilization in turn often boils down to formalistic calculations of simple problems. One of the reasons for such falling short of

target is the fact that at the present time optimal engineering design is not discussed in the curricular process in any of the subjects.

As we know, the main examination for the senior cadet is practical work in line units. Adequate attention is devoted in the curricular process to the practical training and preparation of cadets. This is why those who have conscientiously prepared senior research projects for the most part show adequate competence in discussing maintenance matters pertaining to new aircraft equipment (servicing and maintenance procedures, manner of study) and competently assess its reliability. At present all this is done in a formalistic manner in the majority of senior projects, it is true, and therefore it frequently occurs that young engineers in the unit are apprehensive about rough groundwork, take a long time to break in, and frequently become dependent on middle-echelon specialists. As a rule such engineers are adequate only for mastering equipment maintenance rules and regulations. As regards creative development, they lack both knowledge and engineering boldness.

In the unit a young officer should prove himself as a broad-area specialist, as an organizer of the outfit's daily routine and activities, and as an aggressive volunteer activist. In connection with this it would be very useful for the school to operate a course entitled "Introduction to the Area of Specialization," containing selected materials on general and engineering psychology, ergonomics, office administration and clerical matters, methodology and subject matter for conducting training classes in the unit, and certain purely applied technical engineering items. This would be a good introduction to officer service and engineering for the lieutenants.

The senior thesis is the future engineer's first independent project. In commencing it, the senior cadet should, with his instructor's help, draw up a detailed plan and schedule for the entire project period and strictly adhere to this schedule. There should be no vague points left in calculations, circuits or diagrams. He should have solid theoretical validation on all points of the project, and he should have a clear picture of the location, operation and servicing of the assembly he is designing. The senior cadet must bear in mind that the face of the research project is the drawings, which should be executed in precise conformity with existing standards.

Only by considering the recommendations of senior thesis advisors, instructors, and unit aviation engineer service officers can the senior cadet achieve high quality in his senior design project. He will then have a solid foundation for developing in himself the excellent moral-political and professional qualities essential to the armed defender of our great socialist homeland.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

IMPORTANT FLIGHT SIMULATOR CAPABILITIES ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 38-39

[Article, published under the heading "Flying and Psychology," by Candidate of Medical Sciences Maj Med Serv V. Kozlov and Military Instructor Pilot 1st Class Lt Col N. Litvinchuk: "Why Did the Simulator Not Help?"

[Text] Pilot cadet B. Borisov carefully prepared for the forthcoming day of flight training. He thoroughly studied that training tasks for the flight operations shift, and he practice-drilled. He devoted particular attention to the takeoff, since he had been experiencing difficulties with precisely this phase.

As usual, the instructor demonstrated the first cycle in the pattern. Borisov closely observed his actions. The student pilot took over the controls on the second takeoff. Takeoff roll.... The concrete runway dropped away below them. Suddenly the aircraft began a sharp climb. The instructor immediately took over the controls and prevented the development of a dangerous situation. The student pilot had made the same mistake as on previous flights....

Borisov had an excellent grasp of theory and had undergone good simulator preparation. The proficiency check and simulator practice conducted on the eve of the flying day indicated that he was ready to fly. Then what was the problem? The instructor turned for assistance to more experienced command personnel. They helped him understand what had happened. It was ascertained that the takeoff habit the student pilot had acquired on the simulator was the cause of his error.

Since visual perception of the ground on the TL-39 simulator is substantially different from that during an actual flight, simulator takeoff and climbout are performed primarily on the gauges. During this time the student pilot primarily monitors the artificial horizon. Accustomed to distributing his attention in this manner, after an actual takeoff Borisov would shift his view into the cockpit and naturally could not visually determine height and change in height by exterior points of reference. It is this which led to uneven control movements.

Thus good simulator preparation turned out to be a hindrance when this student pilot was mastering actual takeoff procedures. Why did this happen? The fact is that Borisov had learned a habit the forming of which on the simulator was not prescribed. In practical flight training it sometimes happens that higher demands are imposed on practice sessions. We believe that this is one of the reasons why some pilots develop the opinion that simulators are not very effective and why they distrust them. The process of furnishing the pilot with information differs substantially between an actual flight and a cockpit simulator. We shall endeavor to analyze a model of pilot procedures on a simulator and shall compare information diagrams during an actual flight and a flight on the simulator.

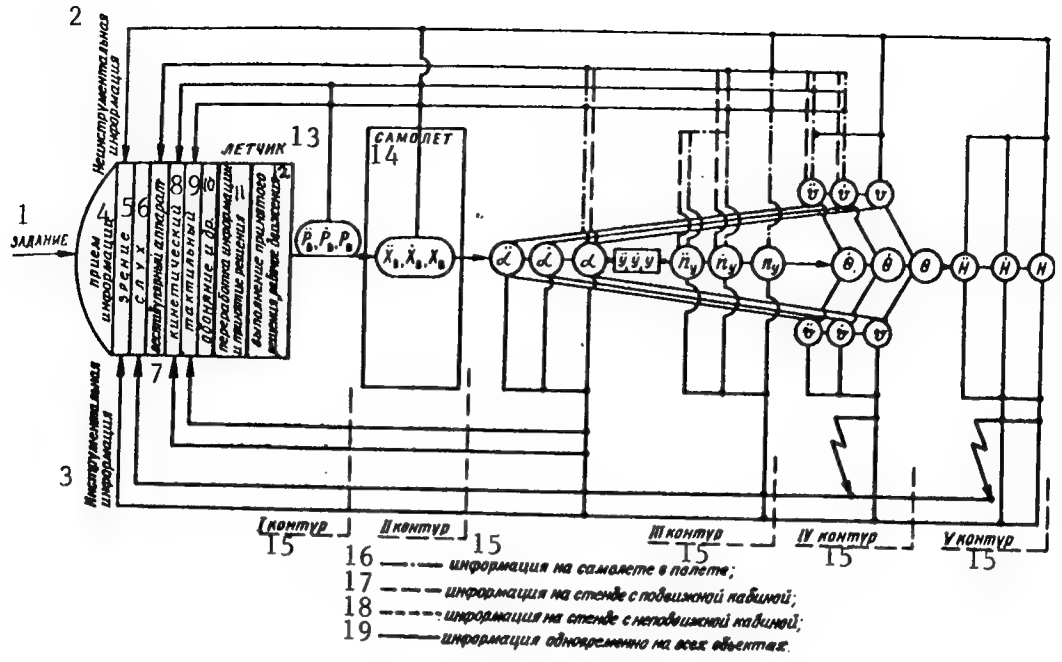
A flight session on the simulator is not accompanied by significant spatial displacements or changes in dynamic characteristics. In addition, the sounds of an operating engine, other equipment and systems, which create important noninstrument signals for the pilot, differ substantially. Only information corresponding to the change in specific flight parameters or operation of aircraft units and systems is simulated to reproduce the picture of an actual flight. Consequently it is many times impossible, for a number of reasons, to simulate an actual flight on the simulator, to achieve a psychological conformity between the pilot's actions and the entire aggregate of instrument and noninstrument information. Therefore as a rule only a certain portion is simulated. As an illustration, the accompanying figure contains information diagrams of an actual flight and a simulator flight with moving and motionless cockpits. For the sake of simplification the figure shows only pitch channel information. Analysis of these data indicates that instrument information is practically identical in all loops. Noninstrument information is also identical in the first and second loops due to the fact that the same controls are placed in the simulator as in an actual aircraft.

In the third loop, when flying the aircraft the pilot receives information on several flight parameters (gamma, beta, alpha, delta, n%, load factors) and their derivatives. Of particular significance here are noninstrument signals (angular accelerations, changes in operating engine noise, vibrations, load factor sensations).

When flying a simulator with a moving cockpit, especially in conditions close to rectilinear steady-state, their quantity is almost the same as when flying an actual aircraft. When maneuvering with an increase in normal load factor, differences in noninstrument information increase in comparison with an actual flight. This is due to the fact that noninstrument load factor signals are not simulated on the cockpit simulator.

On simulators with a motionless cockpit but with a visualization system, noninstrument information in the third loop is represented solely by visual signals. Therefore the pilot is unable to judge angular displacements and load factors. Having executed a control movement, he waits for information from the following loop (speed, bank, pitch).

Noninstrument information, represented by visual signals on an actual aircraft in flight, is even richer in the fourth loop.



Information diagrams of flights on an aircraft and flight simulators with moving and motionless cockpits

Key: 1. Task; 2. Noninstrument information; 3. Instrument information; 4. Receiving of information; 5. Vision; 6. Hearing; 7. Vestibular mechanism; 8. Kinetic; 9. Tactile; 10. Olfactory, etc; 11. Information processing and decision-making; 12. Execution of decision, executing motions; 13. Pilot; 14. Aircraft; 15. Loop; 16. Information on aircraft in flight; 17. Information on flight simulator with moving cockpit; 18. Information on flight simulator with motionless cockpit; 19. Information simultaneously in all environments

---

By visualization of the ground and air environment on the simulator, it is possible to transmit to the pilot almost the entire aggregate of cockpit-exterior information. If it is lacking, however, the pilot can judge changes in speed, pitch, and yaw only from his instruments, and development of visual flying skills is impossible.

Noninstrument information also predominates in the fifth loop. It is visual for the most part, and therefore completeness and accuracy of its simulation depend on the quality of the visualization system installed on the simulator.

Thus the fullest aggregate of noninstrument signals is simulated on flight simulators with a moving cockpit, equipped with a modern ground and air environment visualization system. It is quite natural that information provision to the pilot differs from one simulator to another. This must be

borne in mind when selecting practice drills and flight elements to be practiced on a given simulator.

Let us examine the specific features of utilization of simulation equipment in instrument flight, visual flight, and air combat training.

The principal specific feature of instrument flight is the fact that the pilot orients himself in space utilizing only instrument readings, since there is no information available from outside the cockpit. His task consists in creating a picture of his spatial position on the basis of separate instrument readings. Simulator training aims precisely at forming this picture. In addition, the simulator gives the pilot an opportunity to grasp the relationship between changes in instrument readings and from the readings of one instrument to predict the readings of others.

During actual flight, however, when the ground and natural horizon cannot be seen, there is one more highly significant feature. The fact is that the pilot receives almost the entire aggregate of instrument and noninstrument signals. And his task is to differentiate them, to select the genuine ones and in some measure to force himself, giving up the customary noninstrument signals which are normally utilized in visual flight. Spatial orientation requires an active directional thrust of the consciousness toward continuous evaluation of incoming information. In other words, two mental mechanisms are operating during instrument flight. The first differentiates perceived information and inhibits unnecessary information, while the second forms and shapes the spatial position image. And it is not surprising that many years of practical experience has produced a very important principle: during flight in IFR conditions have faith in the instruments, not in physical sensations. Consequently, on the simulator the pilot develops habits and skills of instrument flying in "hothouse" conditions, in which there is not taking place differentiation of incoming information and inhibition of harmful information. That is, the pilot does not learn to inhibit in a prompt and timely manner harmful noninstrument signals which are capable of distorting his notion of his spatial attitude and can help generate illusion. Precisely for this reason he is not guaranteed against deceptive illusion in actual instrument flying conditions. Only by simulating a more or less full volume of noninstrument signals can one form all the habits and skills requisite for flying in instrument meteorological conditions.

A specific feature of the pilot's work when flying to develop piloting techniques consists in precisely maintaining the principle of change of parameters during maneuvering. The development of piloting skills proceeds in two stages. The first is characterized by the fact that the pilot puts the aircraft into a maneuver and then maintains the parameters of the maneuver on the basis of his instruments, since noninstrument signals in the new maneuver conditions are not fully known to him, and the pilot lacks the habit and skill of flying according to these signals. At the second stage the pilot flies primarily on the basis of noninstrument signals. Thus an important place in training the combat pilot is occupied by forming skills in utilizing noninstrument signals according to which experienced pilots fly.

It is advisable to use a simulator at the first stage of preflight training. It can be employed at the second stage if a large volume of noninstrument signals is simulated.

Student pilot preparation for executing maneuvers should commence with dual flights. Switching on of physiological defense mechanisms by student pilots in conditions of G-loads (bunching, tensing the stomach muscles and lower extremities) ensures forming an integral picture of each maneuver. This makes it possible to evaluate in a practical manner how important it is to switch on physiological defense mechanisms at the proper time when practicing maneuvers on the simulator, even in the absence of noninstrument load factor signals.

Attacking a target is a distinctive feature of combat flying. At this time the pilot continuously distributes his attention between two groups of information sources: for accomplishing the task of piloting (flight and navigation instruments, sources of noninstrument flight information) and combat (gunsight group, visually-perceived target). Virtually the same controls are used. In this instance it is essential to distribute attention efficiently, to operate the control surfaces in a coordinated manner, and precisely to evaluate the tactical environment. These skills can be developed on a simulator. Observations indicate that as they improve, the pilot utilizes noninstrument nonvisual signals with increasing frequency in performing the task of flying the aircraft. This enables him to devote more time to working with the gunsight group and thus to increase the effectiveness of combat employment. Consequently in order to form the requisite habits and skills on the simulator, it is necessary to simulate to the fullest possible degree the aggregate of noninstrument signals, especially nonvisual (noise, vibration, G-load sensations).

The effectiveness of simulator training, however, is determined not only by the volume of simulated information. An important condition is the student's attitude toward it. It has been proven that even with activities close to an actual flying environment, the effect from training is poor if the pilot distrusts the simulator.

Only with good knowledge of the information diagram, the simulator's capabilities and the specific features of simulation of flying activity on it can one correctly select and substantiate an exercise and form individual skills and abilities, which unquestionably will improve the quality of the pilot's professional training.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

EARLY COSMONAUT SELECTION PROCESS DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 40-42

[Article, published under the heading "Star City Then and Now," by Hero of the Soviet Union Maj Gen Avn (Ret) L. Goreglyad and Hero of the Soviet Union Pilot-Cosmonaut USSR Maj Gen Avn G. Shonin: "On the Eve"]

> [Text] 11 January 1985 is the 25th anniversary of establishment of the Cosmonaut Training Center imeni Yu. A. Gagarin. In this time the world-renowned Zvezdnyy Gorodok [Star City, Startown] has grown up from virtually an empty site in Moscow Oblast. At the request of our readers, this journal's editorial staff has prepared from our correspondents' notes interviews with specialists and pilot-cosmonauts, telling the story of the development of the Cosmonaut Training Center imeni Yu. A. Gagarin. Participating in today's discussion are Hero of the Soviet Union Maj Gen Avn (Ret) L. Goreglyad and Hero of the Soviet Union Pilot-Cosmonaut USSR Maj Gen Avn G. Shonin.

(Hero of the Soviet Union Maj Gen Avn (Ret) L. Goreglyad): Startown. It is unlikely that there is a single place on our planet today where this name is not known. And yet 25 years ago it existed only in the dreams of a very small number of people.

A CPSU Central Committee and USSR Council of Ministers decree on medical-biological preparation of man for space flight was issued in January 1959. There immediately arose a great many questions connected with resolving this problem. A team of specialists set up by party and government decision was to find answers to them or, more precisely, to solve them in a practical manner. Where did the work done by these specialists begin? With a determination of the profession within which future cosmonaut candidates should be sought out.

Illness has long been considered one of the greatest dangers to man. But no matter how serious illness has been, doctors have always come to the patient's aid. Time and again they have put their own lives at risk for the sake of saving the sick. History contains numerous examples where certain doctors have deliberately become infected in order to test on themselves the effect of new medicines and to ascertain how to cure patients. In the opinion of the

medical people, a doctor should be the first space explorer. Back in 1956, when Sergey Pavlovich Korolev, following a series of biological experiments with geophysical rockets, proposed a manned suborbital flight, the doctors were the first to throw their support behind his idea. Applications from A. Genin, I. Kas'yan, A. Seryapin, Ye. Shepelev, and Ye. Yuganov were placed on his desk.

Space technology engineers could not boast of great experience at that time, but nevertheless they designed the first spacecraft and were more familiar with it than anybody else. And naturally many of them dreamed of testing it in space. The Chief Designer was also entertaining this thought. And when the first opportunity arose, he sent one of his designers -- K. Feoktistov -- on a manned mission.

Fighter pilots proved better prepared than others for space flight. They fly at high altitudes, wearing special suits, they are familiar with G-loads and hypoxia, and are parachute jump-qualified. The fighter pilot more frequently than others encounters situations which cause great emotional stress and which demand quickness and preciseness of reaction, volition, boldness, ingenuity, and purposefulness. He is familiar with theory of flight, flight and navigation equipment, and he can operate communications gear. This is why the decision was made to train fighter pilots as the first cosmonauts. At that time I was appointed deputy to Gen N. Kamanin.

But who should train the cosmonauts? Since the question was whether man could live in space, the answer was obvious: medical doctors. In addition, doctors had been working for years on precisely this problem. I would like to mention at this point Vladimir Ivanovich Yazdovskiy. He was not only a pioneer in medical-biological problems of manned space flight but was also the first in this country to proceed to resolve these problems in a practical manner, subsequently working on them together with other specialists. The certificate accompanying the gold medal presented to him as an international aviation medicine academy laureate states: "To Professor V. Yazdovskiy for his unique experiments which substantiated the possibility of manned space flight and for successful accomplishment of the first manned flights."

These experiments began on 22 July 1951, when a geophysical rocket carrying the dogs Tsygan and Dezik on board was fired to altitude of 100.8 kilometers. The influence of space flight factors on a living organism was studied on dogs and other animals, and apparatus was developed to record and monitor the physiological state of laboratory animals and of that environment which is created in confined spaces. Some of the animals flew a second mission, and one dog went up four times. The obtained result was very important, because it made it possible to study the reactions of the animals to the effect of all space flight factors. In investigating the free-fall segment, a rescue system was developed which included ejection and parachuting of the animal enclosed in a spacesuit -- a prototype of the landing system employed with the first Vostok spacecraft. This phase of investigation ended with the flight of a rocket nose cone to an altitude of 450 kilometers. We were actually ready at that time for a suborbital flight, such as the mission flown in May and July 1961 by U.S. astronauts A. Shepard and V. Grissom.

The next phase of investigation commenced following the launching of the first satellite. The CPSU Central Committee requested that the scientists and designers honor the 40th anniversary of Soviet rule with a new scientific achievement in space. At that time a program was drawn up and equipment designed and built for the Layka flight in literally a month's time. The result was acquisition of unique data, and our country firmly consolidated its status of primacy in space exploration.

Soviet scientists and design engineers had reached the point to inaugurate a manned space program. The time had come to design and build a spacecraft and prepare man to fly it. The most difficult task in designing and building a spacecraft was the development of a propulsion unit for deceleration. While we were well advanced in other systems, methods of return from orbital flight were a totally blank area in the practical experience of scientists and designers. Even the very approach to starting up s rocket motor in a state of weightlessness presented a problem. Nevertheless, thanks to exceptionally selfless work by the people at the special design office headed by A. Isayev, a retrorocket system was ready by May 1960, and three months later the first living beings -- the dogs Belka and Strelka -- returned to Earth safe and sound from an orbital flight.

Animals had successfully endured launch into orbit, flight in a condition of weightlessness, and return to Earth. But could man endure these stresses? At that time it was known from the writings of scientists that weightlessness can cause spatial disorientation and dizziness connected with change in the functions of the vestibular mechanism, impairment of coordination of motions, as well as increased flow of blood to the head. All these theoretical theses required verification, however. And if they were confirmed, it would be necessary to find ways to prevent them. Test devices creating weightlessness in terrestrial conditions were ruled out at the very outset, since they simulated this factor of space flight only for a few seconds. The UTI MiG-15 fighter was adapted for training cosmonauts.

Other little-studied factors involved in space flight included the radiation belts discovered in 1958, solar radiation, and the meteorite hazard. They could not be simulated on the Earth, and we were relying chiefly on the scientists' theoretical calculations. As regards reduced barometric pressure and G-loads, certain practical experience had already been gained in aviation, and we made full use of that experience. A special spacesuit and life support system were designed and built for cosmonauts. Pilots were already acquainted with G-loads from the centrifuge. This device was suggested for use in cosmonaut training.

The testing of ejection in a spacesuit, conducted in conditions close to those of a cosmonaut returning to Earth on board a Vostok spacecraft, was a concluding phase in testing equipment for a manned space mission.

Thus equipment was being prepared step by step for the first manned space flight.

Selection of cosmonaut candidates was proceeding in parallel, and perhaps was running somewhat ahead of the engineers and test personnel, and a cosmonaut

training program was being devised. Ye. Fedorov, I. Bryanov, and M. Vyadro from the Central Aviation Hospital, as well as the hospital's administrator, A. Usanov, were very helpful in this work.

Establishment of a base facility and selection of personnel to train the cosmonauts began the main directional thrust in our work. Contacts were being established with Soviet industrial organizations, scientific research institutes and higher educational institutions, in order to approach solving our assigned tasks in a more or less scientific manner. At the same time we were becoming acquainted with people and seeking suitable candidates.

The chief of the cosmonaut training center was to become a principal figure in the new program. There were several candidates for this position, but the choice fell on a medical doctor, Yevgeniy Anatol'yevich Karpov. And the choice proved to be a good one. The following were appointed as his deputies: party member Nikolay Fedorovich Nikeryasov, a charming individual and ideological inspirational force for the first cosmonauts; Yestafiy Yevseyevich Tselikin, a gifted pilot, in charge of cosmonaut flight training; Vladimir Vasil'yevich Kovalev, head of the training department; and Anatoliy Ivanovich Susoyev, head of the logistics department. Following were the first instructors assigned to the cosmonaut program: Professor V. Yazdovskiy and a group of doctors under his supervision -- A. Genin, O. Gazenko, A. Seryapin, N. Gurovskiy, F. Gorbov; B. Raushenbakh and K. Feoktistov, specialists from S. Korolev's design office; Honored Master of Sport USSR parachutist N. Nikitin, and young but demanding physical culture instructor B. Legon'kov, who studied the rudiments of the space sciences together with their students.

Training commenced in Moscow, in one of the two-story buildings at the former Central Airfield, but several months later classes were moved out into Moscow Oblast. Today it is easy to see how correct we were in transferring the training center from Moscow. It would have been besieged day and night by hundreds and thousands of visitors and autograph hunters. The initiative for the change of location must be credited to Vasiliy Yakovlevich Klokov. The committee, visiting the proposed site, approved it, and we proceeded to seek transfer of the site to our disposal. Soon all necessary formalities had been concluded, and the Cosmonaut Training Center was moved to its new, permanent location.

(Hero of the Soviet Union Maj Gen Avn G. Shonin): I recall a day in the fall of the now far-off year 1959. It was Monday. The commanding officer had summoned several of our squadron's pilots. We had no idea why. I thought back over every tiny detail on how I had spent Sunday, what I had done, where I had been, and with whom. Everything appeared to be in order. At headquarters we encountered pilots from the neighboring unit.

"Zhora, did they pull you guys out of the ice?" Yuriy Gagarin cheerily greeted us.

It seems that he too had been summoned by the commanding officer.

All of us walked up to the office door together. There are no brave spirits in such situations. Therefore we simultaneously entered the room and reported to the CO.

"It is actually not me who wants to see you," the commanding officer stated, casting his gaze our way. "Go into the adjoining room. Some visitors want to talk to you."

This was something else altogether! And once again we entered the adjoining room as a group. They politely asked us to leave, however, and enter one at a time.

...It was my turn. I entered the room. Two elderly gentlemen were seated at a table. Both were lieutenant colonels, medical service, in naval uniforms. They asked me to be seated and proceeded to ask questions. They were of a routine nature: how my work was going, how my flying was progressing, whether I had become accustomed to the Arctic, what I did in my free time, what I read, etc. They asked me how I was handling my party duties.

"Perhaps we shall meet again," they said in parting.

The news that the doctors were interested primarily in young pilots quickly spread throughout the base, and the uncertainty with which each interview ended gave birth to various rumors.

Another round of interviews began two days later. This time not all the pilots from the first group were summoned. And the interviews were of a more definitive nature. After receiving a detailed briefing on my flight training, they asked me if I would like to try flying a craft of a totally new type. I immediately felt a letdown. Many helicopter units were being formed at the time, and naturally they needed pilots. In those years the helicopter did not enjoy the popularity it deserved with the pilot community.

"I am a fighter pilot," I replied. "I specifically chose a school where they teach you to fly jet aircraft, not...."

"Not that! You've got it wrong. We are talking about long flights, flying around the Earth on a rocket."

"Around the Earth?" I echoed and, suddenly grasping what they were talking about, hastened to add: "I'll do it! I'll fly around the Earth on anything you like. Even on a witch's broomstick, but it better be today, and if not today then tomorrow. I cannot go very long without flying. I am a pilot."

"You may rest assured. Manned space flight is just around the corner. But you must undergo a very complete medical examination in Moscow. You may fail one of the tests, and all your efforts will have been in vain. Does that prospect bother you?"

"I'm ready to go!"

"Wait for a call to come to Moscow. Good luck!"

...I stepped down onto the platform at Leningrad Station. This was my first trip to Moscow; I was unfamiliar with the city. With the assistance of a taxi driver I made my way to the Central Aviation Scientific Research Hospital. I was escorted from the reception area into the "house of lords," as my predecessors had dubbed their abode. There were about 20 beds in a large room. It was evening, and the "patients" were readying for bed. The place livened up with my arrival. The questions came fast and furious: who was I, where was I from, what service school had I graduated from, what aircraft had I flown and where? None of them were from my native region, none of them had gone to the same school, and none knew any of my acquaintances.

They proceeded to brief me. After my exhaustive briefing on the selection methods and results, I had a hard time falling asleep, tossing and turning, wondering what the future had in store for me. But there was good reason to entertain doubts and nervousness. We were subjected to detailed medical testing and examination which went far beyond our annual special medical board.

But who could say precisely at the time what the medical requirements should be? Today we know that they were two or even three times greater than actually necessary. On the average only one out of every 15 persons made it through the entire battery of tests and examinations. In a few instances individuals were even grounded as a result. And who could guarantee that you would not meet a similar fate? It is therefore not surprising that among my new acquaintances there were those who in the midst of the selection process declined further examination and returned to their former duty assignments. For the sake of the future, however, it was necessary to risk the present -- the pilot's profession, the right to fly.

Waking up the next morning with a heavy head, I nevertheless decided to try my luck. The examination process would involve practically the entire day. They certainly were thorough! As the press correctly reported later, the first cosmonaut detachment went through a "severe and harsh selection process."

After supper we would usually gather in our ward. We would joke, relate amusing anecdotes and make up the wildest stories. When we would be weary of this, everybody would fall silent for a time. Taking a more serious note, one by one the fellows would recall incidents from their lives and friends and in their outfit.

Time passed. By mid-December the "House of Lords" had become quite empty, and I, the last one remaining, was transferred to another room. In my time free from testing and examinations I would stroll along the paths of a snow-covered park, recall the other fellows, and in the evenings I would hurry over to our improvised "interesting encounters club." Gen I. Kozhedub, who was at the hospital, as he put it, for a "little checkup of the old system," continuously presided over the club for a period of a week and a half.

On 30 December, after exactly 40 days, the board declared me fit for work in the special group. This is approximately how they selected us, young fighter

pilots from various aviation units of the Air Forces, Air Defense Forces, and Navy.

Fairly bursting with joy, I hurried back to my squadron to usher in the new year of 1960 together with my friends. Twenty-four hours later I was back in my unit, and that very day I got together with Yuriy Gagarin. We now shared a secret. We discussed in length our not yet entirely clear future.

At the end of February those who had been passed by the board were summoned to Moscow. An additional brief examination awaited us. When it was completed, our group of 12 was received by Chief Mar Avn K. Vershinin. He spoke parting words to us on the eve of a long and difficult journey.

The following day we returned to our regiments with orders to settle affairs immediately and return to Moscow for testing activities. Our orders bore the signature "N. Kamanin." We had never seen it before. Subsequently, during the next 12 years, this signature appeared on the principal documents which determined all work pertaining to establishment of the Cosmonaut Training Center.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

EVOLUTION OF U.S. SATELLITE COMMUNICATIONS SYSTEMS REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 42-43

[Article, published under the heading "The Pentagon's Orbital Arsenal," by Col M. Krymov and G. Sapov: "Navigation and Communications"; based on materials published in the foreign press]

[Text] The U.S. armed forces, which constitute the principal instrument for implementing the aggressive imperialist policy of the U.S. leadership, have always needed a reliable navigation support system for performance of "policeman" functions in various parts of the world. Immediately after World War II the Pentagon proceeded to develop various navigation systems designed to determine the precise position of its combat aircraft and warships plying the ocean and air tens of thousands of kilometers distant from U.S. soil. Ground radio navigation systems were developed, such as Loran A and Loran C which, however, were not entirely satisfactory to the Pentagon, due to their comparatively low degree of accuracy of navigation fixes, poor effective range, and limitations in the deployment of ground navigation stations.

The Transit and Nova first-generation navigation satellites were developed and put into operation in the 1960's-1970's through the efforts of the U.S. Department of Defense and the military-industrial complex. These satellites, designed to operate for several years, provided a position fix on warships and military aircraft with an accuracy ranging from several hundred to tens of meters. Development subsequently began on the GSP military radio navigation system, based on the new-generation Navstar satellites. It was designed to perform a broad range of tasks: determination of position and speed of ships and aircraft, support of air combat operations, direct support of ground troops, all-weather assault delivery, and aimed bomb delivery. Foreign observers also note growing Pentagon interest in using the Navstar system for missile guidance. In particular, it is pointed out that a number of U.S. companies are conducting experiments for the purpose of evaluating the possibilities of using Navstar satellites for guidance of cruise missiles and even MX intercontinental ballistic missiles.

The GSP system was to include 18 primary and 3 backup Navstar satellites, orbiting at an altitude of about 20,000 km and positioned in 6 planes (3 satellites in each). The system designer promises users a position fix at any

point on Earth in three coordinates (latitude, longitude, and altitude) with an accuracy to about 15 meters and speed with an accuracy to a fraction of a foot per second (1 foot=0.3 m). It is stated that the GSP system is four times more accurate than any weapons delivery support navigation system presently in operation. It is scheduled to become operational in the latter half of the 1980's.

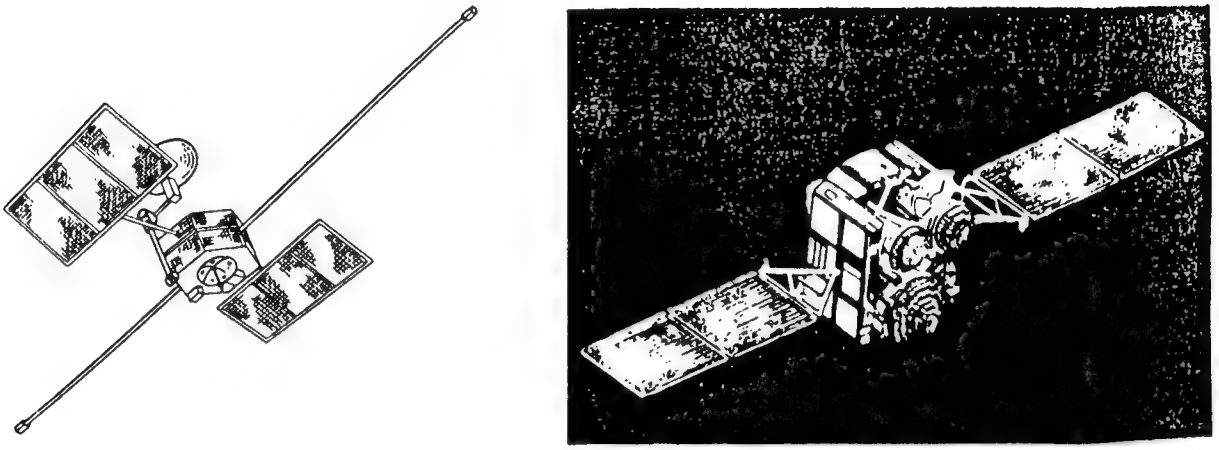
U.S. companies are developing an entire spectrum of navigation information receiving equipment, so-called user systems. These are to be installed on more than 30,000 vehicles (aircraft, ships, tanks, trucks). Basically the individual unit includes a receiver with antenna, mini-computer, display, control unit, and power supply. Man-portable backpack units weighing about 7 kilograms have also been developed, which can be carried on tanks and trucks. Each such unit is designed to receive position signals simultaneously from four Navstar satellites. The U.S. Air Force and the designers of the GSP system are prescribing special measures aimed at increasing these satellites' survivability and jamming resistance. Foreign experts state that they include provision of cross-communication between satellites and enhancement of satellite protection against damage from a nuclear burst and laser emissions.

The development of a global satellite navigation system, as the Pentagon envisages it, should first and foremost ensure superiority in quality of command, control and combat employment of forces in a future war, and should also increase the effectiveness of actions by U.S. interventionist forces in those parts of the world declared to be "vitally important" to U.S. interests.

As regards military satellite communication systems, major U.S. corporations began developing such systems under contract with the Pentagon at the end of the 1950's. Primarily the Navy was involved in development of such communications. In 1965 the nuclear-powered carriers "Midway" and "Canberra" were equipped with terminals to interact with Syncom II and Syncom III satellites. In 1967 the principles of communication between naval ships and P-2B patrol aircraft in the VHF and UHF bands via the LES-5 experimental satellite were worked out, and the Fleetsatcom U.S. Navy and Air Force tactical global communications system became operational in 1979. It is this system which is presently serving the U.S. Navy in various regions of the world ocean in conformity with the doctrine of "projected presence." The peoples of Lebanon and Grenada, the countries of Central America and the Persian Gulf are well familiar with this doctrine. Wherever U.S. imperialism has undertaken military ventures, there have loomed the silhouettes of aircraft carriers and battleships flying the Stars and Stripes, exerting pressure on independent nations, meddling in their internal affairs, and even perpetrating outright acts of aggression.

As the United States proceeded with plans to militarize space within the framework of the strategic arms modernization program, and taking into consideration a revision of the tasks of satellite communications for command, control and reconnaissance in conditions of employment of nuclear weapons, in 1983 U.S. authorities proceeded with deployment of the new DSCS III strategic and tactical communications system, since Fleetsatcom reportedly fails to meet requirements pertaining to resistance to jamming, security (broad-pattern

antennas), protection against electromagnetic pulses and other nuclear burst damage-producing elements. The new system, built by General Electric, boasts enhanced jamming resistance provided by switchable narrow-beam antennas with "nulling" of the receiving antenna pattern to minimum interference on Earth-transmitted command. The relay satellite is antiradiation-protected and is tested at underground nuclear ranges prior to launch into orbit. The DSCS III satellite communications system operates in the 1 cm and 10 cm bands and is designed to transmit data by noiselike signal methods with pseudorandom frequency switching between mobile and stationary ground-based stations as well as airborne and shipborne terminals.



Fleetsatcom and DSCS III communications satellites

For communications in the polar regions, which are not covered by the Fleetsatcom and DSCS III systems, the United States employs Afsatcom repeaters carried on SDS satellites in elliptical orbits (perigee 390 km, apogee 39,560 km) with an inclination of approximately 63 degrees. The system based on the SDS satellites is used as a component of the Air Force command and telemetry system (communications between the SCF satellite control facility in Sunnyvale, California and tracking stations situated in various parts of the world), as well as for combat control of Strategic Air Command aircraft (B-52 bombers and FB-111 fighter-bombers), which fly missions in the polar regions close to the northern borders of the USSR. In the SDS network there are 12 duplex channels in the 10 centimeter band for combat control.

Hughes Aircraft's new Leasat system has been in the process of becoming operational since mid-1984 as a supplement to already existing systems. It consists of four Syncom IV wide-bodied satellites and is intended for tactical communications among Pentagon operational subdivisions, such as the Rapid Deployment Forces, for example.

Since 1982 the United States has been heavily involved in development of the promising Milstar communications system which, in the opinion of Pentagon spokesmen, is suitable to the adopted "antisatellite defense" plans and new beamed-energy weapons. To achieve a high degree of resistance to jamming and low probability of detection of vehicles and installations working with the satellite, the relay satellite will employ acicular (diameter of coverage zone 150 km) switchable antennas with automatic "nulling" of the pattern to an interference minimum. The satellite will provide complex processing of encoded noiselike signals transmitted with pseudorandom frequency switching within a 2 GHz band with separate types of multistation access: frequency on the Earth-satellite link, and time on the satellite-Earth link. The relay satellite is protected against the effects of laser emissions, radiation, electromagnetic pulse, and carries an onboard computer system for extended operation in self-contained mode and for maneuvering in orbit.

A committee specially formed to deal with problems of "strategic defense" attaches paramount importance to the Milstar program as a means "ensuring reliable and secure communications in conditions of employment of nuclear burst casualty producers."

Precisely this system, which consists of four satellites in geostationary orbit and three in polar orbits with "silent" backup will ensure transmission of information for the benefit of all branches of the U.S. armed forces and will constitute that principal mode of communications on which the Pentagon intends to rely both in peacetime and in conditions of future "star wars," for it alone, they claim, meets the requirements of security, invulnerability, and immunity to jamming.

In 1982 the Air Force budgeted 500 million dollars to the Milstar program. This year the figure has already been revised, and a new amount has been specified -- 1.5 billion dollars. But what will be the expenditures on this system by the completion stage of work on the lead satellite in 1987? The U.S. secretary of defense replied to this question as follows: "We shall spend as much as is needed to ensure the fastest possible strengthening of our combat potential." The meaning of this reply is that companies do not need to be concerned about technical difficulties which may arrise in designing and developing "star wars" communications and weapon systems.

A special consortium of the leading "whales" of the rocket and space industry was established for the purpose of implementing the Milstar program, which was preceded by an 8-year study and research phase with the LES 8 and LES 9 experimental communications satellites. Orders were placed with them to build various assemblies and satellite terminals for the Air Force, Navy, and Army. Yes, the thick gold vein of space business opened up by the U.S. President for the bosses of big business in California and Texas, which contain the highest concentration of military industry in general and the aerospace industry in particular, is inexhaustible.

Parallel with the Milstar program, work is in progress on an Afsatcom second-stage system designed for emergency communications with strategic forces. It is planned to utilize in this network four Stratsat satellites weighing 1.4

tons each, launched into circular polar orbits at about 20,000 kilometers in order to enhance survivability.

A prominent role in future "star wars" scenarios is assigned to laser communications systems, which are already today widely employed on intersatellite links both for data transmission and to improve the survivability of military satellite systems of various designation. For example, in the geostationary system providing early warning on strategic missile launches, where information is transmitted via a laser intersatellite communications link from vehicles and installations in the Indian Ocean region, which is beyond coverage from U.S. soil, to a receiving station at Buckley Field, Colorado via DSP satellites.

More than half of U.S. strategic nuclear munitions are presently deployed at sea, for the most part on submarines armed with Trident II missiles. Deployment on submarines of a new nuclear weapon -- long-range cruise missiles -- has commenced. In view of this rearmament program, U.S. naval authorities note that communications between submarine and shore base may prove to be a weak link in the chain providing for launching of missiles in wartime, and are requesting additional appropriations for laser communications systems between satellite and submerged submarine. Experimental communications sessions were conducted for this purpose, involving the submarine "Dolphin" and a T-39 Sabreliner aircraft, carrying on board a laser transmitter emitting in the blue-green portion of the spectrum, which penetrates water to great depths.

The above-cited facts clearly show where the threat to peace originates, who is preparing for nuclear war on Earth and in space, and who is attempting to organize a new "crusade" against socialism. Today, however, in conditions of a balance of forces in the international arena which has irrevocably tipped in favor of socialism, the path of aggressive imperialist circles is blocked by the mighty economic potential and invincible defense might of the USSR, the monolithic solidarity of the Soviet society, and the indissoluble unity of the Communist Party and people. No military venture on the part of imperialism will take us unawares. "Any aggressor," Comrade K. U. Chernenko emphasized at a get-together with workers at Moscow's Hammer and Sickle Metallurgical Plant, "will be hit with immediate retaliation."

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

OVERVIEW OF CURRENT STATUS OF APPLIED SPACE TECHNOLOGY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 44-45

[Article, published under the heading "The Space Program Serving Science and the Economy," by M. Aleksandrov: "Space -- Arena of Man's Activity"; first part of two-part article]

[Text] The launching of the first artificial Earth satellite and Yuriy Gagarin's space flight marked the beginning of the study and exploration of space. And a question immediately arose: why has man set about to do this? Even today a reply to this question is the subject of serious scientific and philosophical treatises, as well as popular science literature and fiction. It is discussed at symposiums, congresses, and conferences.

Time and again man has asked himself a similar question in the past, when he would come face to face with the unknown. Such was the case with exploration of the sea and ocean depths, the air, and the bowels of the Earth. The sea, for example, was viewed as something wild and rampaging, sinister, promising no practical benefit. In time, however, man realized that the sea expanses can shorten travel distances and that ships offer an inexpensive means of locomotion. It was precisely sea voyages which resulted in the discovery of America and India, Australia and Antarctica. Man learned that not only food but raw materials can be obtained from the seas and oceans. Geological prospecting ensued, and open-work oil derricks became an integral part of the seascape.

The above also applies in full measure to space. And as always, things begin primarily with a study of this new space, this new element, which has its "tides," its electromagnetic storms, flares, winds, etc. But it is not only curiosity and a thirst for scientific knowledge which entice man into space.

Konstantin Eduardovich Tsiolkovskiy once made a prophetic statement: "Mankind will not remain eternally on the Earth but, in the pursuit of light and space, will at first timidly probe beyond the boundaries of the atmosphere, and ultimately will conquer all circumsolar space." And while these words seemed pure fantasy in K. E. Tsiolkovskiy's time, today they have become an everyday reality.

"One of the most engrossing problems which have stirred man's mind over the course of centuries," stated S. P. Korolev, "is the problem of flight to other planets and to the far reaches of the universe." Approximately a quarter of a century has passed since these words were spoken. During this time unmanned probes and manned spacecraft have conducted the most diversified scientific investigations of the Moon and have returned to Earth specimens of lunar soil. Nor have Mercury, Venus, Mars, and Jupiter been ignored. This journal has reported to our readers the results of these investigations. But what are the prospects of further study of the planets?

Two interplanetary probes are scheduled to be launched at the end of this year, for the purpose of continuing study of the planet Venus and to investigate Halley's Comet. In 1985, as they fly past Venus, these craft will drop descent probes to obtain new data on the planet and its atmosphere, while the craft themselves will continue their journey in a heliocentric orbit, to rendezvous with Halley's Comet in 1986 for the purpose of photographing it and studying the physical characteristics and chemical composition of the cometary material. The scientific apparatus for conducting these investigations is being prepared by Soviet specialists jointly with specialists from other countries. The launching of our interplanetary probes toward Halley's Comet in 1985 will be followed by vehicles launched by the European Space Agency and Japan, in the launching of which they will utilize data obtained from the earlier-launched Soviet probes. The USSR Academy of Sciences has established close contacts with all countries taking part in preparation for these scientifically interesting experiments for the purpose of coordinating efforts on this program.

As regards Mars, scientists see several possible variant plans of study. First, with aid of a "Mars rover", placed directly onto that planet or its moons, Phobos and Deimos. A second, more informative variation would involve the return of Martian soil to Earth by means of returnable space probes, as was done with the collection of Lunar soil. According to the latest proposal published abroad, a lander module would proceed to the Martian surface and collect a soil sample at the coldest time of the night, in order for it to contain a maximum quantity of condensed atmospheric gases. After packing the soil sample in a sealed container, the Martian ascent module would launch into an areocentric orbit, where it would remain for 300-400 days, waiting for a favorable time, from the standpoint of energy expenditure, to commence the return flight to Earth. As it approached the Earth, the craft would execute an orbital correction and a reentry vehicle with the sealed container would separate from it, plunging into the Earth's atmosphere and descending by parachute to a soft landing.

Mercury is situated close to the sun, and therefore direct launchings toward Mercury from the Earth require considerable energy expenditures (it is necessary to cancel out a substantial portion of the Earth's heliocentric velocity). Scientists see a solution in utilizing the gravitational field of Venus. Just as in the case of Mars, plans are being drawn up, calling for a landing on the surface of Mercury and subsequent return of soil samples to Earth.

As regards future plans for studying Jupiter, a landing on the planet's surface is highly unlikely in the near future. Therefore investigation of this planet will be accomplished primarily with the aid of probes released into the atmosphere. Plans call for photographing the planet and its moons, studying the properties and character of the motions of gases in the atmosphere, magnetic field, as well as investigation of Jupiter's moons, including the landing of spacecraft on their surface.

Human activity in near space has experienced the greatest development to date. Dozens of communications satellites are orbiting the Earth, which are being used to relay telephone conversations, one-way and two-way telegraph communications, transmission of Central Television programming, typeset central newspapers, and technical information. Satellite communications have no limits, and can provide communication between any points on Earth. In addition, approximately 100 Orbita ground stations are operating in the Soviet Union and in the countries of our friends, making it possible to receive Central Television programming in the most remote areas of our country and abroad.

Realization of the concept of individual communications is highly promising. It consists in building communications spacecraft equipped with large multiwave antennas, high-powered transmitters, and miniature individual transceivers. Communications spacecraft, parked in stationary orbit, will provide communications capability among a virtually unlimited number of users. According to a report in the foreign press, for example, one satellite communications design provides capability for simultaneous utilization by 2.5 million persons. It is suggested that the system will function as follows. The caller enters the desired party's address code into the transceiver. The call request, received by the spacecraft, is placed in sequence by an onboard computer. After a suitable channel becomes available, the desired party is called up. Evidently in the not too distant future this communications system will replace costly wire communications and insufficiently high-quality and stable radio communications.

The concept of direct TV broadcasting to individual sets is currently widely practiced in our country. When the Ekran system and 3,000 receiving stations located in remote areas of Siberia, the Altai, the Far East and Far North went into operation, the national TV audience grew by 3 million persons.

Satellite navigation is being increasingly more widely used. Today the majority of merchant vessels carry a comparatively small unit which enables the user to determine his position and course by satellite with a high degree of accuracy (to tens of meters). In addition, some countries (USA, Canada, Japan, and others) have passed legislation prohibiting port entry by foreign vessels that do not carry satellite navigation equipment. The further development of electronics and microminiaturization will make it possible in the near future to reduce user receiver gear to the size of a book or pack of cigarettes, which will lead to its mass individual utilization in place of the compass and other conventional means of determining position.

Individual navigation instruments will come into widespread use when small vessels and motor vehicles, as well as geologists and vacation travelers are

equipped with these devices. A combination of a navigation and communications system will make it possible to establish a dispatcher service for keeping track of the movement of vehicles and cargo.

Air traffic control, control of maritime shipping and fishing vessels can be set up on the basis of this equipment, and it could replace dispatcher communications in rail transport and arctic navigation surveillance.

The extremely important and humane task of rescuing people in distress is being successfully accomplished as a concomitant to satellite navigation. A national satellite system designated KOSPAS has been developed in the Soviet Union.

The system's principle of operation is fairly simple. System users obtain a commercially-manufactured radio beacon, which in an emergency situation is switched on manually or automatically (for example, on contact with water). When the radio beacon activates, a radio transmitter with a self-contained power supply switches on, broadcasting a distress signal and that radio beacon's identification number.

Additional information can be transmitted by pressing buttons on the small control panel which is part of the emergency locator beacon kit: what the victims need, where they are located, the nature of the emergency, etc. These signals are picked up by an overflying navigation satellite carrying transceivers and computer devices designed for this system. Upon passing over an information receiving station (PPI), the satellite relays down the received information and telemetry data, which pinpoint the crash site with an accuracy of 2-3 km, and search and rescue teams are dispatched to the site.

The system is a component of the international KOSPAS-SARSAT system, and therefore distress signals are picked up both by Soviet and U.S. satellites and are relayed to 10 PPI in six different countries (USSR, United States, Canada, France, Norway, Great Britain) taking part in this program. The distress signal received by a PPI is immediately transmitted to the national information collection center, and from there to the national center in the crash victims' country and to appropriate national and international rescue services. Experimental development of these systems is currently in the completion stages, and soon they will go into regular operation.

This equipment was tested and demonstrated in 1978 during a voyage by the nuclear-powered icebreaker "Sibir'" from Murmansk across the Arctic Ocean to Soviet eastern ports. Right up to the northernmost latitudes the ship was receiving Ekran system Central Television broadcasts, and the ship's crew was able to communicate with relatives and loved ones via satellite and local telephone system.

Information on the ice situation and on hydrometeorological conditions in the Arctic Ocean, received from Meteor satellites, was also extensively utilized during the voyage of the nuclear-powered icebreaker "Sibir'." These satellites have long been performing dependable service observing terrestrial weather conditions, and twice every 24 hours provide an overall picture of the weather over any region of the Earth.

Further development of meteorological satellites will make it possible to monitor the ecological environment of man's habitat, pollution of the upper and lower atmosphere, the state of the ozone layer, and the Sun's functioning. (To be concluded)

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

INDEXED LIST OF ARTICLES APPEARING IN 1984 ISSUES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 84 (signed to press 1 Nov 84) pp 46-47

[Index of articles published in AVIATSIYA I KOSMONAVTIKA during 1984]

Political and Military Indoctrination

Military-Historical and Military-Political Articles

For a High Degree of Combat Readiness

Practical Aerodynamics for the Pilot

Aviation Engineer Support of Combat Training and Problems of Air Forces Rear Services

Flight Safety

Military Educational Institution Affairs

The Space Program and the Economy

Science Serving the Homeland

Years, People, Deeds

Your Health

Flight and Psychology. Topics of Morality

Abroad

Criticism and Bibliography

COPYRIGHT: "Aviatsiya i kosmonavtika", 1984.

3024
CSO: 9144/194

END